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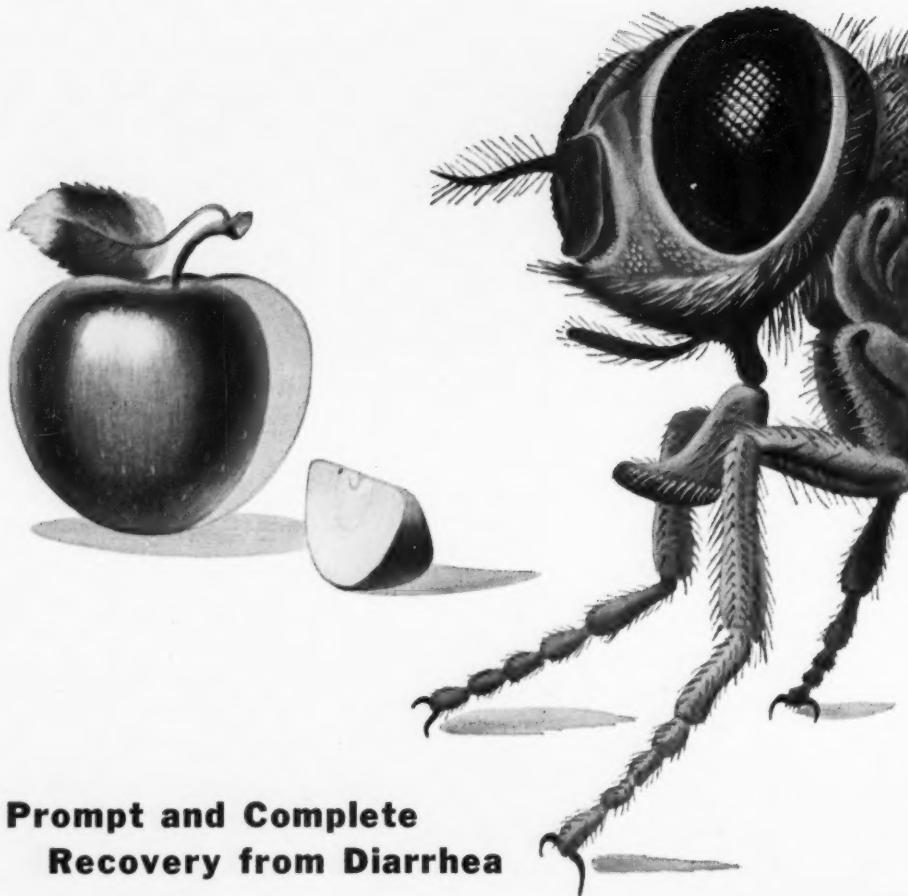
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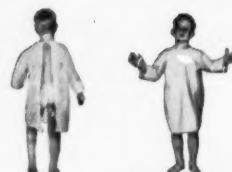
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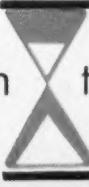
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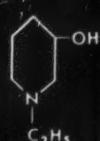
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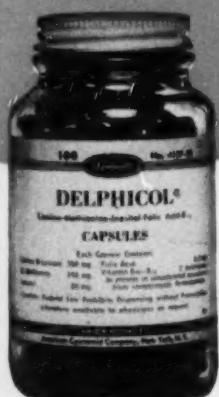
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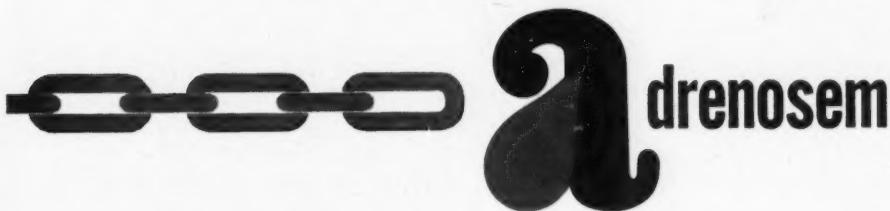
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*Sherber, D. A.: The Control of Bleeding, Am. J. Surg. 86:331 (Sept.) 1953.



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CLINICAL AND ROENTGENOLOGIC EVALUATION OF BANTHINE ON THE MOTILITY OF THE COLON

MICHAEL H. STREICHER, M.S., M.D., Chicago, Ill.

INTRODUCTION

BANTHINE is an anticholinergic drug and is known chemically as a methantheline bromide. Longino, Grimson, Chittum and Metcalf (1) indicate that Banthine has an atropine-like action as is shown in preventing contraction of strips of excised rabbit ileum when stimulated by acetylcholine, and has autonomic ganglion blocking action on the sympathetic and parasympathetic system; it also exerts an atropine-like action at the post-ganglionic nerve endings of the parasympathetic system.

Kern and Almy (2) made studies on colonic activity in normal human beings by obtaining tracings of pressure changes in balloons inserted into the colon; they concluded that oral administration of 100 mgm. of Banthine reduces normal colonic activity 15 minutes after ingestion of the drug and that it continues for more than two hours.

Individual clinical reports showing that Banthine decreases colonic contractions were made by Kern, Almy and Stock (3) and by Plummer, Burke and Williams (4). Our interest was directed primarily toward the effects of Banthine upon the motility of the colon on a large group of patients.*

Associate Professor of Medicine, University of Illinois, College of Medicine.

Presented at the American Medical Association Annual Session as a Scientific Exhibit, New York, New York, June 1 to 5, 1953.

*This study was made possible through the courtesy of G. D. Searle and Company who sponsored a research project at the University of Illinois, College of Medicine.

PROCEDURE AND METHODS

We have selected one hundred patients with disease of the colon and studied them clinically and roentgenologically. The group comprised 27 patients having constipation, 46 patients having ulcerative colitis, 7 patients having spastic colitis and 10 patients with permanent ileostomies following total colectomies. Normal controls were also included in this series. Patients were either hospitalized or studied ambulatorily. Evaluation of the motility of the colon was made clinically by determining the variation in the average number of stools daily before and after Banthine, by the presence or absence of abdominal pain and cramping (referable to the colon), and by the presence or absence of blood in the stool.

Roentgenologically a comparison was made determining the variation in the emptying time of the colon in hours before and after oral administration of Banthine. A standard amount of barium was given to each patient by mouth. Barium progress was visualized daily by continuous fluoroscopy and by repeated films.

In each patient, the study was made during the first week clinically and roentgenologically without administration of Banthine; during the second week similar studies were repeated after oral administration of 50 mgm. of Banthine four times daily. Upon completion of the 2 week study with roentgenologic evaluation of the motility of the colon, clinical studies were continued for 90 days in each patient, only the Banthine was decreased to 50 mgm. three times daily. The averages recorded in Table III are averages for one day.

RESULTS

In the clinical evaluation the results were classified

TABLE I

SHOWING VARIATIONS IN THE NUMBER OF STOOL EVACUATIONS
BEFORE AND AFTER INTAKE OF BANTHINE

CLINICAL RESULTS ON 100 PATIENTS

No. of Pts.	Diagnosis	Average Number of Daily Evacuations															During Banthine						
		0	1	2	3	4	5	6	7	8	12	15	Av.	0	1	2	3	4	5	6	7	Av.	
27	Constipation	16	9 ^a	2 ^b									2	19	7	1						1	
46	Chronic Ulcerative Colitis	1	9	9	3	6	5	8	1	2	2	5		2	25	14	5					1	
7	Spastic Colitis	2	2	1	2								2		2	5						1	
10	Ileostomies												4			10						2	
10	Normal Controls												10			2	4	6				1	

a, b) The average evacuation reported weights from 2 to 4 Grams.

EFFECT OF BANTHINE ON MOTILITY OF COLON

TABLE II

SHOWING VARIATIONS IN MOTILITY AS UNCHANGED, HASTENED OR DELAYED AFTER INTAKE OF BANTHINE. (BASED ON THE EMPTYING TIME OF THE COLON IN HOURS BEFORE AND DURING BANTHINE)

ROENTGENOLOGIC RESULTS ON 100 PATIENTS

No. of Pts.	Diagnosis	Emptying time of Colon			During Bantline		
		Before	During	Ave. emptying time in hours	U*	H	D
27	Constipation	77	113				100%
46	Chronic Ulcerative Colitis	62	101				100%
7	Spastic Colitis	68	120				100%
10	Ileostomies			NO STUDIES MADE			
10	Normal Controls	72	108				100%

*U—unchanged; H—hastened; D—delayed.

as variations in the number of stool evacuations daily before and after intake of Bantline.

In Table I, we show these variations in 27 patients with constipation, 46 patients having ulcerative colitis, 7 patients with spastic colitis and 10 patients with permanent ileostomies following total colectomies. Normal controls are also included in this table.

In the roentgenologic evaluation, the results were classified as variations in the emptying time of the colon in hours before and after Bantline. These variations are expressed in Table II. This table incorporates the roentgenologic studies of the same group of patients recorded in Table I.

In Table III a summation of clinical results is shown expressing variations in motility of the colon as unchanged, hastened or delayed.

In Table II a summation of the roentgenologic results is shown expressing variations in motility of the colon as unchanged, hastened or delayed.

In the summation of the results roentgenologically we were interested in determining the variations in

the emptying time of different anatomical portions of the colon. We are, therefore, presenting Table IV.

DISCUSSION: CLINICAL EVALUATION

The laboratory experiments of Longino, Grimson, Chittum and Metcalf (1), by Kern and Almy (2), by Kern, Almy and Stock (3) and by Plummer, Burke and Williams (4) are substantiated by many clinical reports. Segal (5) in using 100 mgm. of Bantline every six hours in 3 patients with regional enteritis found the patients were relieved of their pain and diarrhea.

Golden (6) reported that two patients with ulcerative colitis, diarrhea, abdominal pain and loss of weight were relieved after intake of 100 mgm. of Bantline every six hours.

Kern, Almy and Stock (3) in investigating the motility of the sigmoid in 23 normal subjects by kymographic recordings of pressure changes in inlying balloons, state that 100 mgm. given orally completely abolishes sigmoid motility for prolonged periods. They report that in diarrheas the number of movements de-

TABLE III

SHOWING VARIATIONS IN MOTILITY AS UNCHANGED, HASTENED OR DELAYED AFTER INTAKE OF BANTHINE. (BASED ON AVERAGE NUMBER OF EVACUATIONS DAILY BEFORE AND DURING BANTHINE)

CLINICAL RESULTS ON 100 PATIENTS

No. of Pts.	Diagnosis	Emptying Time of Colon			During Bantline		
		Ave. No. of Evacuations Daily	Before	During	U*	H	D
27	Constipation	2	1	2			25
46	Chronic Ulcerative Colitis	5	1	4			42
7	Spastic Colitis	2	1				7
10 ^a	Ileostomies	4	2				10 ^a
10	Normal controls	2	1				10

*U—Unchanged; H—Hastened; D—Delayed; a—This refers to evacuation of ileostomy.

TABLE IV

SHOWING VARIATIONS IN EMPTYING TIME (IN HOURS) OF THE CECUM, TRANSVERSE COLON AND SIGMOID BEFORE AND AFTER INTAKE OF BANTHINE

ROENTGENOLOGIC RESULTS ON 100 PATIENTS

No. of Pts.	Diagnosis	Emptying Time in Hours					
		Before Bantline			During Bantline		
Cecum	Transv. Colon	Sigmoid & Rectum	Cecum	Transv. Colon	Sigmoid & Rectum		
27	Constipation	19	39	77	43	73	113
46	Chronic Ulcerative Colitis	11	33	62	29	61	101
7	Spastic Colitis	14	45	68	34	84	120
10	Ileostomies			NO STUDIES MADE			
10	Normal Controls	12	38	72	31	69	108

creased, the stools became less liquid, the amount of mucus diminished and that the urgency was less.

Plummer, Burke and Williams (4) also report that four of five patients who had non-specific colitis appeared to obtain relief from abdominal cramps on a dosage of 150 to 200 mgm. of Bantline.

McHardy, Browne, Marek, McHardy and Ward (8) report that hypermotility, diarrhea in amebiasis, tuberculous cecitis, chronic ulcerative colitis and lymphopathia venereum were not influenced, and that actual colon disease entities were not influenced by Bantline; they also report that in severe irritable colon syndrome methantheline in doses of 400 mgm. daily had a limited but appreciably favorable effect. Apparently their estimations of the efficacy of Bantline in the colon are entirely subjective.

In the evaluation of our studies, we find parallelism in the results obtained by the individual reports made by other investigators. Our attention was directed primarily toward clinical and roentgenologic evaluation of Bantline in common diseases of the colon. We have studied a large group of patients with constipation, chronic ulcerative colitis, spastic colitis, patients with permanent ileostomies (individuals who have frequent evacuations of liquid consistency) and also included studies on a group of normal individuals (individuals who do not have diseases of the colon).

In Table I, it is apparent that the group of patients with constipation averaged two stools daily before intake of Bantline and that the number of evacuations was decreased to 1 daily after oral intake of 50 mgm. of Bantline 3 to 4 times daily. The averages recorded are daily averages. The patients with constipation who have reported as having 2 stools daily were reporting stools of very small quantities (weighing from 2 to 4 grams per stool). The average normal stool passage weighs about 100 grams.

In patients with ulcerative colitis we found that the number of daily evacuations decreased from an average of 5 to an average of one. This finding parallels the decrease of blood in the stool after Bantline. The favorable clinical results with Bantline were sustained only upon continual use of Bantline; four patients did not respond to Bantline.

The pain and cramping in the lower abdominal region is decreased considerably after prolonged intake of Bantline. Dosages of 50 mgm. 3 to 4 times daily are sufficient to produce optimum results if used over prolonged intervals followed by a period of rest.

In spastic colitis the degree of spasms has been alleviated considerably and in 4 patients the spasms in the lower abdomen have subsided entirely.

We were gratified in the results obtained in patients with permanent ileostomies; by the use of Ban-

TABLE IV A

SHOWING THE RANGE IN EMPTYING TIME (IN HOURS) OF THE CECUM, TRANSVERSE COLON AND SIGMOID BEFORE AND DURING INTAKE OF BANTHINE

ROENTGENOLOGIC RESULTS ON 100 PATIENTS

No. of Pts.	Diagnosis	Emptying Time in Hours					
		Before Bantline			During Bantline		
Cecum	Transv. Colon	Sigmoid & Rectum	Cecum	Transv. Colon	Sigmoid & Rectum		
27	Constipation	7 to 48	24 to 72	72 to 120	24 to 72	68 to 96	96 to 144
46	Chronic Ulcerative Colitis	4 to 24	7 to 48	24 to 96	7 to 96	24 to 96	96 to 144
7	Spastic Colitis	7 to 24	24 to 96	60 to 120	24 to 72	72 to 120	114 to 144
10	Normal Controls	7 to 24	24 to 48	48 to 96	24 to 48	48 to 96	96 to 120

TABLE V
SHOWING DELAY OF EMPTYING TIME OF COLON IN PERCENT HOURS

No. of Pts.	Diagnosis	Cecum	Before Banthine		Cecum	During Banthine		Percent Delay with Banthine	
			Transv. Colon	Sigmoid & Rectum Time in Hours		Transv. Colon	Sigmoid & Rectum Time in Hours	Cecum	Transv. Colon
27	Constipation	19	39	77	43	73	113	126	87
46	Chronic Ulcerative Colitis	11	33	62	29	61	101	163	85
7	Spastic Colitis	14	45	68	34	84	120	143	86
10	Normal Controls	12	38	72	31	69	108	160	81

thine of 50 mgm. two to three times daily we were able to change the consistency of the numerous evacuations from a liquid to a semiformed condition and were able to reduce the number of evacuations. While ileostomies are not considered as diseases of the colon we are including this group as a control group in comparing the results obtained in conditions of the colon that produce diarrheas.

UNTOWARD EFFECTS

The patients have noted only minor discomfort following intake of 50 mgm. of Banthine 3 to 4 times daily over continual usage of this drug for 2 to 3 months uninterruptedly. In the entire group of patients studied, one patient reported mild dryness of the throat only on the 4th day, the second patient noted a soreness of the mouth and the third patient reported a burning or an itching of the rectum lasting from the 2nd to the 4th day of intake. These disturbances were mild and did not require any treatment and did not require discontinuance of Banthine therapy.

In summation of our clinical observations, the impression we have is that Banthine delays motility of the colon and that it accomplishes these results very effectively. Since spasms of the colon are spasms of smooth muscle and since smooth muscle spasm is neural in origin one therefore assumes that such spasms are the result of transmission of neural stimuli to smooth muscle through the medium of acetylcholine.

Benson, Schwartzman, Green and Reed (7) amplify the fact that Banthine therefore acts as an anticholinergic drug through its ability to inhibit the transmission of neural stimuli at the sites where acetylcholine serves to transmit the impulse.

ROENTGENOLOGIC EVALUATION

To verify the clinical results obtained in these patients we applied standard methods of roentgenologic procedures in evaluating variation in motility of the colon before and after Banthine. The criterion used is the emptying time of the colon in hours after intake of barium meal and obtaining a comparison of the emptying time before and after intake of Banthine. We were also interested in determining if possible which anatomical portion of the colon is primarily responsible for the delay in the motility of the colon.

In Table II, the results show that in 27 patients with constipation the emptying time of the colon in hours is delayed after intake by 36 hours.

The emptying time of the colon in 46 patients with chronic ulcerative colitis is delayed by 39 hours. Parallel results in emptying time of the colon were noted in patients with spastic colitis and in the normal controls.

The patients with ileostomies presented inconsistent results in emptying time of the ileostomy roentgenologically and it is, therefore, that we cannot correlate the findings in this group except by clinical observations.

In 27 patients with constipation the emptying time of the cecum was delayed by 24 hours after Banthine, and the emptying time of the transverse colon was delayed by 34 hours, while that of the entire colon was delayed by 36 hours.

In 46 patients with chronic ulcerative colitis similar comparisons are made of the emptying time of the cecum, the transverse colon and the entire colon. Parallel results in the delay of the emptying time of the cecum, of the transverse colon and of the entire

TABLE VI
SHOWING EMPTYING TIME OF COLON IN PERCENT OF PATIENTS

No. of Pts.	Diagnosis	Before Banthine				During Banthine			
		Cecum		Transv. Colon	Sigmoid & Rectum	Cecum		Transv. Colon	Sigmoid & Rectum
		Less than 24 hours	Less than 48 hours	Less than 72 hours	More than 24 hours	More than 48 hours	More than 72 hours		
27	Constipation	44	41	29	63	80	88		
46	Chronic Ulcerative Colitis	67	52	48	96	64	70		
7	Spastic Colitis	60	30	20	100	60	100		
10	Normal Controls	70	40	10	100	70	100		

colon are noted in patients with spastic colitis and in the normal controls.

Making a comparative analysis in determining which anatomical segment of the colon presents the optimum delay in motility we can make the following observation: The cecum presents the optimum delay in the consideration of segmental delay, this is shown in Table V and Table VI.

CONCLUSIONS

1. By clinical observations Banthine delays motility of the colon in patients who have constipation, chronic ulcerative colitis, spastic colitis, ileostomies, and normal persons.
2. By roentgenologic observations, Banthine delays motility of the colon in the same group of patients studied clinically.
3. By roentgenologic evaluations, the optimum delay in the motility of the colon is noted in the cecum.

We wish to extend our gratitude to Dr. Roger Harvey, Head of the Department of Radiology for his help in this work and to the nurses, interns and residents who helped in this work in the hospital.

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OBSERVATIONS ON A METHOD FOR SUSPECTING THE PRESENCE OF ACTIVE DUODENAL ULCER BY PHYSICAL EXAMINATION

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THE ATTITUDE of the physician in 1910 toward the diagnosis of peptic ulcer was summarized by the following quotation from the writing of Moynihan (1): "The symptoms so perfectly characteristic of duodenal ulcer may be present for years without producing any physical signs. It is, therefore, not necessary to the attaining of an accurate diagnosis that any physical examination of the patient be made. The anamnesis is everything, the physical examination relatively nothing."

In the ensuing years, however, Boas (2), Mendel (3) and Jacob Meyer (4) suggested physical diagnostic signs based upon the elicitation of a painful response following pressure on the 11th to 12th thoracic vertebrae, or following pinching or percussion of the epigastric area. These signs did not find wide acceptance, probably because of the variability of the responses that were obtained. Other writers refer to epigastric tenderness as a fairly frequent finding, but again, acknowledge the unreliability of subjective responses. To this date, textbooks in the fields of Internal Medicine, Surgery, Gastroenterology, and Physical Diagnosis quite universally quote Moynihan's dictum: "The anamnesis is everything, the physical examination relatively nothing" (5-19).

The diagnosis, it is true, may readily be suspected when the history is "classical," but such histories are quite uncommon. There are remarkable variations in perceptiveness of subjective phenomena. The inability

to formulate subjective experiences into verbalizations may prevent adequate communication with the physician. Pain thresholds vary considerably. Patients may minimize or deny the existence of symptoms to serve particular psychic needs. Laterally, the symptom-masking effects of the newer hormone and steroids (ACTH, Cortisone, etc.) have become well known, and in selected cases, histories of gastrointestinal abnormality may be entirely absent until hemorrhage or perforation has occurred.

The physical examination, in light of observations here to be reported, has proven to be of inestimable value in suspecting the presence of active peptic ulcer, regardless of the patient's history.

PATIENT SELECTION AND METHOD OF PHYSICAL EXAMINATION

Consecutive unselected patients, the variety of practice usually seen by an Internist, constituted the subject material upon which this study was based. The ages varied from 16 to 76. There were 100 patients in the series.

The method used was as follows: The patient was placed on an examining table in a semi-reclining position, arms resting comfortably at the sides, knees drawn up. Abdominal relaxation was encouraged as much as possible. The examiner first palpated the lower quadrants, using a bilateral but alternating pressure, then slowly approached the epigastric region.

The single significant diagnostic determinant in the physical examination was the comparative valuation of the degree of muscle guarding between the right and left epigastric areas. Whenever selective right epigastric guarding was found, a "positive sign," the patients were referred for radiologic consultation to the laboratories of Drs. M. Horwitz and S. Mesirow, whose roentgen technique is described as follows.

METHOD OF X-RAY EXAMINATION

Prior to the onset of the examination, the patient is asked to fast for at least eight hours. The patient is clothed in a cotton gown, and a scout film of the abdomen is taken. The patient is then placed in a vertical position and after preliminary roentgenoscopy of the chest and abdomen, is asked to swallow one ounce of fairly thick Baridol suspension. Spot films are then made in the anteroposterior and right anterior oblique projections of the stomach. The patient is then tilted to the horizontal position, the barium manually distributed over the entire mucous membrane of the stomach, and supine and oblique roentgenograms taken. Barium emptied into the duodenal bulb and arch is also filmed in this position. The patient is tilted to the vertical position and spot roentgenograms are obtained of the upper stomach, showing the gastric air bubble and mucous membrane pattern of the upper half or third of that organ. The subject is instructed to swallow four to five ounces of thinner Baridol suspension and segmental mucosal relief spot films, with and without compression, are taken. Returned to the supine position, mucosal relief spot films are then taken of the cardiac end of the stomach. The patient is rolled to a prone position, rotated to the right, and the anterior and posterior walls, and the greater and lesser curvature of the stomach are observed fluoroscopically. Then mucosal relief and serial films of the antrum, proximal duodenum, laterals and obliques of the entire stomach and duodenum are taken by the technician. A final film is a prone view of the entire stomach and duodenal arch. Small intestine studies are made at intervals, a four hour motility exposure completing the examination.

RESULTS

Table 1 is a summary of the results obtained on the 100 patients comprising this series. 94 patients presented a "positive sign," and 6 had a "doubtful sign." In all 94 cases, the common finding was the presence of moderate to severe hyperkinetic duodenal dysfunction. 63 of the 94 had active duodenal lesions with demonstrable craters. The 31 patients with a "positive sign," but without demonstrable craters, had many of the secondary radiologic characteristics of peptic ulcer. The 6 patients with a "doubtful sign" had negative radiologic findings. Further details will be noted in the discussion.

DISCUSSION

The insouciance of patients to symptoms, the uncertainties of the anamnesis, and the de-emphasis of the importance of the physical examination, all probably contribute to the inadequate recognition of the ulcer state by both the patient and the physician. It is not too surprising that hemorrhage and perforation are

found to occur as "initial" symptoms in 10-15% of ulcer cases. The significance of this figure may be appreciated with the recognition that there are about 3,000,000 patients annually with active ulcers in the United States, and there are about 10,000 deaths every year from the complications, hemorrhage, perforation, or obstruction, due to peptic ulcer. The necessity for continued diagnostic and therapeutic efforts is of obvious importance from an economic as well as clinical standpoint.

From the results here reported two facts were immediately apparent. First, the basis for the physical diagnostic finding of selective right epigastric guarding was unquestionably duodenal hyperkinesia. (The anatomic specificity of the guarding differential was illustrated by patient D. B., Table 5. This patient was the only one in the series to present a "positive sign" on the left. X-ray studies revealed the presence of *situs inversus*.) Secondly, in every instance where an ulcer crater was demonstrated, duodenal hyperkinesia was inevitably present. One is tempted to surmise that duodenal hyperkinesia may be a *sine qua non* in the genesis of the ulcer state.

Ryle (20), Sherrington and Hurst (21), and Morley (22) have considered modifications of smooth muscle states of prime importance in the production of symptoms and signs of visceral abnormality. Experimentally, such factors as increased intraluminal pressure, sustained contraction or undue distension of visceral musculature, and initiation of peritoneosensory motor reflexes are believed to be operative. Pottenger (23) has stated that visceromotor reflexes of the gastrointestinal tract are reflected by spasm of the internal, external, and transverse abdominis musculature. The clinical observation reported here may find some basis in, and correlation with, these earlier contributions.

The radiologic recognition of active peptic ulcer lesions in 63 of the 94 patients found to have a "positive sign" was very interesting. But, the most striking, and clinically most significant finding was the discovery of the presence of active lesions with craters in 19 patients who had requested consultations either for evaluation of symptoms relative to organ systems other than the gastrointestinal tract, or for general examinations with no specific complaints. (Table 2). Suspicion of gastrointestinal pathology was aroused purely on the basis of the physical examination employing the technique described. It is conceivable that some of these patients may have gone on to hemorrhage or perforation had the ulcer state not been detected. It is also possible that the 10-15% of proven ulcer patients who present complications initially may derive from a similar symptom-free or symptom-denial group.

Several further observations are noted. Abdominal cramping and diarrhea are not ordinarily considered to be symptoms suggestive of the presence of duodenal ulcer. Yet, of the 63 proven cases, 15 had experienced these symptoms in varying duration and intensity (Table 3). The "positive sign" suggested the correct diagnosis, and treatment led to relief of symptoms in each instance. (Stool studies are done routinely to rule out the presence of parasitic infections of the gastrointestinal tract.)

There were 7 patients who were known to have had active lesions in the past, and who had been off therapy. There had been a recurrence of symptoms. The "positive sign" was present in each instance.

Several patients complained of lower chest pain. The "positive sign" was significant in clarifying the differential diagnosis, and relief followed ulcer therapy.

29 of the 63 patients with demonstrable crater had dyspeptic symptoms of one form or another, and with or without abdominal pain (Table 4). This group is probably representative of the patients most frequently seen in practice where the history suggests the proper avenue of diagnostic investigation. Again, the finding of a "positive sign," rather than primary radiologic examination suggested the presence of active lesions.

Another group of patients is comprised of 31 cases (Table 5). The "positive sign" was present, but ulcer crater were not demonstrated in this group. However, all showed the secondary manifestations usually associated with active duodenal lesions, such as gastric hyperperistalsis, antral gastritis, hyperkinesia, duodenal mucosal edema, etc., etc., in varying degree and number. Many gastroenterologists would consider these findings as concomitants of non-demonstrable mucosal lesions. These patients were placed on full therapeutic regimes, for it was felt that the ulcer potential was extremely high in this group, and the institution of therapy might prevent serious sequelae.

Finally, it is to be noted that the patients in this series were not receiving treatment prior to their initial examinations. It was found that antispasmodic therapy resulted in the disappearance of the guarding differential within a week or two, usually, and sometimes within a few days. Obviously, absence of a "positive sign" in a patient under treatment is not to be interpreted as absence of ulcer activity.

CONCLUSIONS

The dictum, since the turn of the century, that the existence of the peptic ulcer state can be surmised only from the history, and that the physical examination is relatively unimportant, is questioned in this study. The physical examination, using a comparative bimanual palpation of the right and left epigastric areas, was found to have a much greater diagnostic potential than previously recognized. Selective right epigastric guarding was considered to be a "positive sign," and warranted insistence upon radiologic examination of the upper gastrointestinal tract.

From the results here reported, it is suggested that utilization of the described technique could extend the diagnostic facility of the clinician. Suspicion of the existence of the ulcer state may obtain purely on the basis of the physical examination, and regardless of the patient's history.

SUMMARY

TABLE I.

No. of
Patients

I. Negative gastrointestinal history, "positive sign," demonstrable ulcer crater	19
II. History of cramping or diarrhea, "positive sign," demonstrable ulcer crater	15

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III. Dyspeptic symptoms, "positive sign," demonstrable ulcer crater	29
IV. "Positive sign," crater not demonstrated, but with radiologic evidence of secondary manifestations of upper gastrointestinal tract abnormality, as hyperkinesia, antral gastritis, etc.	31
V. "Doubtful sign," negative radiologic findings	6
Total	100

TABLE II
REASON FOR CONSULTATION. (PATIENTS FOUND TO HAVE "POSITIVE SIGN," DEMONSTRATED CRATER, BUT WITHOUT HISTORY OF GASTROINTESTINAL ABNORMALITY)

Patient	Sex and Age	Reason for consultation
1. L. B.	M 32	Unexplained weight loss.
2. S. B.	F 50	Fatigue state. General checkup.
3. H. G.	M 43	Cardiac evaluation after suspected paroxysmal tachycardia.
4. S. K.	M 48	Routine checkup, 3 months after mitral commissurotomy.
5. J. R.	M 25	Bloody urethral discharge.
6. E. S.	M 36	Recurrence of asthmatic attacks. Chest pain.
7. H. S.	M 53	Chest pain.
8. M. B.	F 50	Pelvic pain.
9. M. H.	M 55	Checkup 3 weeks after minor auto accident.
10. L. K.	M 50	Checkup 1 week after discharge from hospital following bronchopneumonia.
11. A. K.	M 64	Severe pulmonary emphysema. Checkup.
12. I. R.	F 26	Fatigue state.
13. B. B.	M 40	Fatigue state.
14. F. H.	M 76	General checkup. (Known to have gall bladder calculi).
15. N. C.	F 62	Checkup prior to weight reduction.
16. M. S.	M 63	Annual checkup. Known angina pectoris.
17. L. G.	M 45	Chest pain.
18. D. R.	M 32	Chest pain.
19. E. Y.	M 76	Cardiac evaluation.

TABLE III
HISTORY OF CRAMPING OR DIARRHEA, "POSITIVE SIGN," AND DEMONSTRABLE ULCER CRATER

Patient	Sex and Age	Symptoms
1. I. W.	M 40	Severe abdominal cramps—24 hrs.
2. L. W.	F 36	Severe abdominal cramps—4 hrs.
3. I. K.	M 27	Abdominal cramps, diarrhea 4-5 x daily for 10 days.
4. R. B.	M 33	Abdominal cramps—2 days.
5. E. H.	M 27	Abdominal cramps and nausea, 3 days.

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6. R. K.	M	26	Diarrhea, 2-4 x daily. Amebiasis in 1943, dates symptoms from that time.
7. H. L.	F	46	Diarrhea, 2-3 x daily, 1 week.
8. M. L.	M	16	Diarrhea, 6-7 x daily, 1 week.
9. R. M.	F	68	Diarrhea, 3-4 x daily, 2 weeks.
10. D. R.	M	40	Intermittent diarrhea, 1 yr.
11. L. M.	M	30	Diarrhea, 3-6 x daily, 1 month.
12. C. W.	F	25	Diarrhea, 4-8 x daily, 1 week.
13. L. C.	M	51	Intermittent lower abdominal cramping, 1 week.
14. H. H.	M	31	Intermittent diarrhea, 2-6 x daily, for about 6 months.
15. T. S.	M	46	Intermittent diarrhea, 2-6 x daily, for about 4-5 years.

TABLE IV

PATIENTS WITH DYSPEPTIC SYMPTOMS, "POSITIVE SIGN," AND DEMONSTRATED CRATER

Patient	Sex and Age	Symptoms
1. S. D.	M	16 Abdominal tenderness, pain, and hungry sensation, 4 days.
2. L. D.	M	53 Bloating after eating, 2 weeks.
3. S. D.	F	70 Fullness after meals, 3 weeks.
4. M. D.1	M	46 Heartburn, pain in epigastrium, 1 week.
5. E. H.	F	40 Heartburn and indigestion, 2 weeks.
6. R. L.	M	44 Abdominal pain, 3 days.
7. R. N.	M	36 Intermittent pain and tenderness, 1½ years.
8. S. O.	M	54 Gaseousness and fullness after meals, 2 days.
9. P. R.	F	27 Gaseousness, cramping, night pain, 2 weeks.
10. E. P.	M	27 Burning sensation, indigestion, 2 weeks.
11. M. P.	M	43 Anorexia, indigestion, 3 weeks.
12. M. V.	M	59 Pain, 24 hours.
13. M. D.2	M	44 Epigastric distress, constipation, 48 hours.
14. S. F.	M	37 Nausea and indigestion, 3 days.
15. I. W.	F	31 Nausea and indigestion, intermittently, 2 years.
16. S. W.	M	52 Heartburn and indigestion, 6 months.
17. I. W.	F	27 Fullness after eating, 2 weeks.
18. S. B.	M	66 Pain between meals, intermittently, 5 years.
19. T. K.	M	25 Pain after eating, 5 days.
20. R. L.	M	33 Pain, 24 hours.
21. G. L.	M	36 "Knot in stomach," 1 week.
22. J. T.	M	42 Severe hematemesis.
23. B. C.	M	46 Known ulcer, return of symptoms.
24. M. D.3	M	35 Known ulcer, return of symptoms.
25. B. K.	F	30 Known ulcer, return of symptoms.
26. D. K.	M	55 Known ulcer, return of symptoms.
27. G. A.	M	43 Known ulcer, return of symptoms.
28. D. B.	M	46 Known ulcer, return of symptoms.
29. S. C.	M	51 Known ulcer, return of symptoms.

TABLE V

RADIOLOGIC FINDINGS OF PATIENTS WITH A "POSITIVE SIGN," BUT WITHOUT DEMONSTRABLE CRATER

Patient	Sex and Age	Radiologic findings
1. D. B.	F	51 (This patient had a "positive sign" on the left; shown to have situs inversus.) There was marked gastric hyperperistalsis, an extremely irritable bulb, and marked pylorospasm.
2. M. H.	F	33 Gastric hyperperistalsis with moderate antral and pylorospasm. Antral gastritis with prolapse into the duodenum.
3. S. B.	M	47 Duodenal bulb irregular in outline, and extremely spastic with regurgitation of barium into antrum. Prolapse of antral mucosa into base of bulb.
4. S. R.	M	46 Small hiatus hernia. Very irritable and extremely spastic bulb, with regurgitation of barium into antrum.
5. L. S.	M	30 Moderate gastric hyperperistalsis. Small extremely irritable and spastic bulb.
6. R. B.	M	38 Moderate duodenal spasm. 50% gastric retention after two hours.
7. R. S.	M	47 Moderate gastric hyperperistalsis; irritable and edematous bulb with pylorospasm and prolapse of the antral mucosa.
8. B. L.	F	23 Irritable duodenal bulb with prolapse of the gastric mucosa into the base of the bulb.
9. R. F.	F	48 Carcinomatous ulceration, pars media of the stomach. (Bilateral guarding noted on physical examination).
10. F. H.	M	47 Extreme irritability of the duodenal bulb with edema, spasm, and regurgitation of barium into antrum.
11. S. N.	M	36 Very irritable and spastic bulb with regurgitation of barium into the antrum.
12. A. D.	M	44 Very irritable duodenal bulb with moderate thickening of the antral mucosa.
13. M. K.	M	26 Marked gastric hyperperistalsis with severe pylorospasm and grossly deformed duodenal bulb with moderate edema.
14. C. P.	M	67 Marked gastric hyperperistalsis with deformed and spastic duodenal bulb.
15. J. P.	F	41 Moderate gastric hyperperistalsis, irritable bulb, prolapse of the antral mucosa.
16. M. D.4	M	39 Gastric hyperperistalsis with marked pylorospasm; marked spasm of the apex of the bulb; regurgitation into the antrum.
17. L. S.	M	32 Irritable and spastic bulb with regurgitation into the antrum.
18. F. I.	M	29 Gastric hyperperistalsis with irritable, markedly spastic duodenal bulb; antral and duodenal edematous mucous membrane.

19. A. T.	F	63	Grossly deformed and extremely irritable duodenal bulb with marked hyperperistalsis.	7. Christian, H. A.: Principles and Practices of Medicine, 16th Edition. New York and London, D. Appleton-Century Co., Inc., 1947, p. 1661.
20. L. A.	M	48	Very irritable duodenal bulb.	8. Hyman, H. T.: An Integrated Practice of Medicine, Vol. II. Philadelphia and London, W. B. Saunders Co., 1946, p. 1784.
21. J. F.	F	21	Gastric hyperperistalsis and extremely spastic bulb with antral regurgitation.	9. Yater, W. M.: Fundamentals of Internal Medicine, 3rd Edition. New York, Appleton-Century-Crofts, Inc., 1949, p. 440.
22. R. S.	M	27	Gastric hyperperistalsis and pylorospasm with irritable slightly deformed duodenal bulb.	10. Cecil, R. L.: Textbook of Medicine, 7th Edition. Philadelphia and London, W. B. Saunders Co., 1947, p. 785.
23. K. Me.	M	39	Moderately irritable duodenal bulb with thickened edematous mucous membrane.	11. Sutton, D. C.: Physical Diagnosis. St. Louis, C. V. Mosby Co., 1937, p. 421.
24. R. S.	F	35	Very irritable and edematous bulb with antral regurgitation.	12. White, B. V. and Geschickter, C. F.: Diagnosis in Daily Practice. Philadelphia, London, and Montreal, J. B. Lipincott Co., 1947, p. 106.
25. A. B.	F	36	Very irritable duodenal bulb.	13. Brown, R. C.: Ulcers of the Stomach, Duodenum, and Jejunum. Oxford Medicine, Vol. III, New York, Oxford University Press, 1949, p. 150.
26. L. K.	F	32	Slightly spastic duodenal bulb.	14. Major, R. H.: Physical Diagnosis, 4th Edition. Philadelphia and London, W. B. Saunders Co., 1951, p. 21.
27. E. H.	F	41	Loose antral mucosa herniating into base of duodenal bulb.	15. Loewenburg, S. A.: Medical Diagnosis and Symptomatology. Philadelphia, F. A. Davis Co., 1943, p. 642.
28. B. F.	F	24	Very irritable spastic bulb with antral regurgitation.	16. Ivy, A. C., Grossman, M. I. and Bachrach, W. H.: Peptic Ulcer. Philadelphia and Toronto, Blakiston Co., 1950, p. 783.
29. F. L.	F	58	Moderately irritable duodenal bulb.	17. Pullen, R. L.: Medical Diagnosis, 2nd Edition. Philadelphia and London, W. B. Saunders Co., 1950, p. 573.
30. R. Z.	M	32	Small deformed extremely irritable and spastic bulb with pressure defect in base (prolapsed antral mucosa).	18. Sandweiss, D. J.: Peptic Ulcer. Philadelphia and London, W. B. Saunders Co., 1951, p. 207.
31. A. H.	M	42	Moderately severe pylorospasm with extremely irritable bulb, with antral regurgitation.	19. Bockus, H. L.: Gastroenterology, Vol. I. Philadelphia and London, W. B. Saunders Co., 1949, p. 318.

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OLYGOSYMPTOMATIC ANOMALIES AND PATHOLOGIES. THE ROLE OF GENETIC FACTORS

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IT IS AN old axiom in Medicine to try to bring the various signs and symptoms under one common denominator and uphold the principle of the old thesis that *all signs and symptoms derive their origin from one disease*, and *one only*. Diseases are generally *multisymptomatic*. Under the title of Symptomatology in most textbooks on Medicine or Diagnosis large numbers of signs and symptoms are usually enumerated.

There are exceptions to this general rule, instances, in which "morbus ipsa" does not produce heterogeneous signs and symptoms in its clinical manifestation. They

may be scanty; *oligosymptomatic*, or even absent in "asymptomatic" cases.

In other cases one or more congenital anomalies and acquired pathologies may simultaneously be present with scanty or unimpressive symptomatology. The occurrence of such heterogeneous abnormalities may elicit *few symptoms* only, which can be attributed to *any* of these pathologies, or to their *combinations*.

In still rarer cases scanty signs and symptoms are developed or recognized in the presence of a *series*, in fact, of a *multitude* of pathologies. One step farther, and then even these few signs and symptoms may be



Fig. 1, Case I: Inverted stomach with malrotation of the duodenum.



Fig. 2, Case I: Barium enema. Note redundancy of the splenic flexure. A 14/17 film proves to be too small to enclose the redundancy of this short and stocky individual completely. Non-descent of cecum; missed ceco-ascendens. Note the recto-sigmoid in a short and straight line.



Fig. 3, Case I: Barium enema-post-defecation film. Double contrast method. Note the slight change in the redundancy pattern after partial bowel movement. The ceco-ascendens, though short and high, became noticeable. The recto-sigmoid is still short and straight.

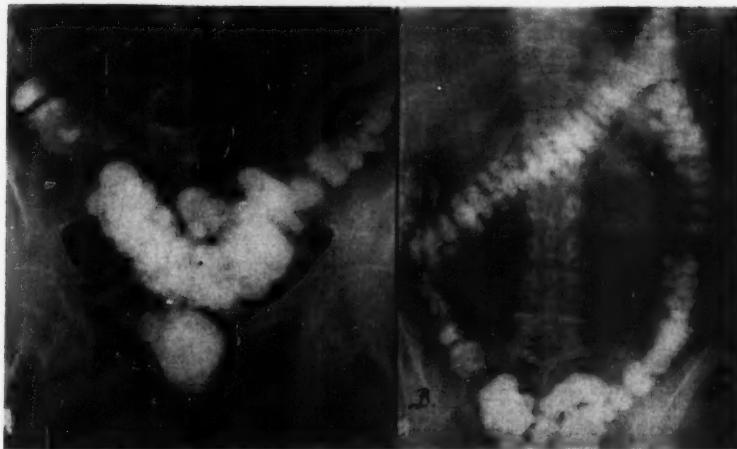


Fig. 4, Case I: Films taken 24 hrs. following a barium enema. A) Redundancy of the sigmoid. B) Redundancy of the sigmoid. The splenic flexure sharp and pointed, without redundancy. The cecooascendens is deep and well haustrated.



Fig. 5, Case I: Sharply angulated gallbladder with diverticulum.

found or proven to be *unrelated* to any of the pathologies, or to their combinations. They may prove to be merely the symptoms of an associated neurosis.

The basis of a correct diagnosis is a thorough examination. With gaps or omissions to a complete examination the physician must necessarily be kept uninformed regarding the full extent of the pathologies of the individual case. There is a tendency to base a diagnosis on the examination directed towards the most obvious or urgent complaints. Such incomplete examination, however, often proves to be unsatisfactory. More thorough work-up is, unfortunately, restricted only to such cases in which a further expenditure of time and effort is clearly required and cannot be avoided. Only a minority of cases belongs to this category. Freely chosen or dictated circumstances may cause one to accept a diagnosis without attempt to ascertain further material facts or diagnostic data. This of course often leads to erroneous diagnosis. In case of a more complete work-up the cause-effect relationship between causative factors and their symptoms could be accomplished on a more satisfactory and scientific basis.

In the following we wish to present a series of cases which are characterized by few signs and symptoms only, in which, however, anomalies and pathologies were represented in larger numbers. There was an incongruity, if not an inverted ratio existing between cause and effect, i.e. between disease and its symptoms. In this series, symptoms, occasionally of queer or grotesque nature, were often found to be *unrelated* to the underlying pathology. They rather referred to a neurosis developing in a constitutionally inadequate on common ground with the congenital anomalies and often in association with acquired pathologies.

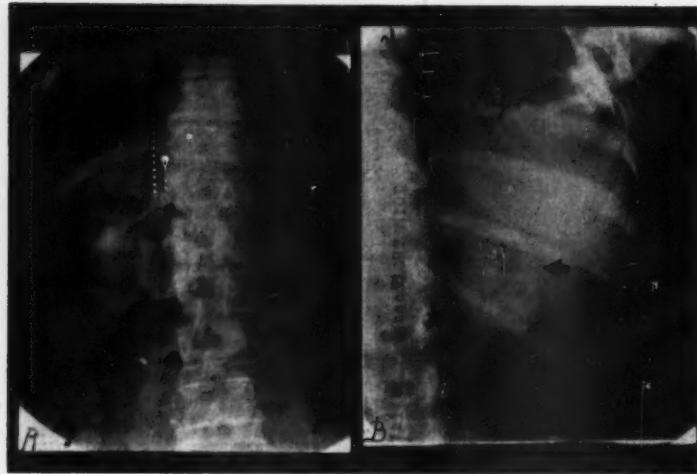


Fig. 6, Case II: A) Arrows point to the presence of stones in the gallbladder (negative shadows) and in the right kidney pelvis.
B) The kidney stone is projected into the gallbladder shadow and the stone shadows are superimposed.

REPORTS OF CASES

First Case. W. O. L., female, white, married, 50, referred to us as a cardiac case, with a past history of coronary occlusion. Cardiological examination, including E. C. G. tracings resulted in completely negative findings. The roentgen study of the G.I.T., however, disclosed: 1) huge redundancy of the splenic flexure; 2) non-descent of cecum; 3) inverted stomach; 4) malrotation of the duodenum, and 5) a sharply angulated gallbladder with diverticulum. The unusual feature of the colonic redundancy evolved around the change of the location of the redundancy. Upon barium enema the splenic flexure exhibited tremendous masses of convoluted loops, whereas the rectum and sigmoid shot up in a short straight line. On the film 24 hrs. later the splenic flexure seemed flattened out and revealed a plain transition of the transverse to the descending colon, whereas the sigmoid, hitherto short and straight, appeared in the shape of marked redundancy.

This patient was a highly sensitive individual. She assured whomever it might concern, that any pain-sensation, or any unfavorable news, even an unpleasant medical examination would promptly be followed by syncope. She could induce fainting spells with considerable expertise. She suffered from abdominal pain, apparently of two different types. The one was located in the left lower quadrant. The clinical symptoms with pain in a circumscribed area, and bouts of painful diarrheas and the x-ray evidence gave a syndrome of a localized sigmoiditis. Prompt response to antibiotics brought about the abolition of this symptom-complex. Pain and discomfort ceased.

The pain across the upper abdomen was considered to be of cardiac origin. Upon examination we concluded that no corroborative evidence existed to entertain the diagnosis of any cardiac ailment. Examination of the heart, including x-ray, orthodiagram, E.C.G., and exercise tolerance test were all negative. The examination of the G.I.T., however, established the



Fig. 7, Case II: A) Free intraarticular bones of the left knee; ant.-post. view.
B) Lateral view.

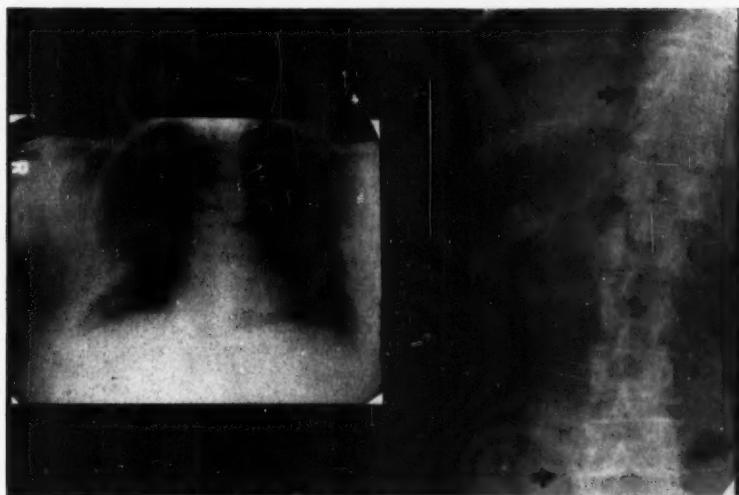


Fig. 8, Case II: A) Massive pleuropulmonary fibrosis of the right side. B) Arrows point to the r. kidney stone and the gallstones; upper and lower arrows point to severe osteoarthritic changes of the spine.

presence of a huge splenic redundancy. This, in the presence of constipation, or esp. of impaired motor power, may cause retention of gases or food remnants, accumulated in pockets, or in a "knuckle." Such mechanism, intermittently recurring, could produce pain, easily mistakenly diagnosed as cardiac in origin. Undoubtedly during one of these painful episodes, possibly in association with fainting spell, patient, mistakenly diagnosed, was rushed to a nearby hospital and was kept there for five weeks. She alleges that upon discharge, without medication or reassurance, she was considered a hopeless cardiac case and was treated as such. She was put on a saltless diet and was restricted in her activities. She felt miserable, dejected and despondent.

She had had no gastrointestinal examination previously. When the fully negative cardiological findings and the presence of harmless anomalies in the G.I.T. were explained to her, she was elated. When the restriction in salt intake and in physical activities was lifted, she regained her ambition and desire to live. Pain and complaints never recurred and now she devoted all her ambition to the one problem which weighed heavily upon her physically and mentally, namely, to reduce her excess weight.

In this case a series of congenital anomalies were incidentally detected in a hyperactive, hypersensitive and highly emotional middle aged business woman. They caused her no symptoms, with the possible exception of colonic redundancy which occasionally might have precipitated some upper abdominal pain. Its erroneous interpretation may have served as a basis for her suffering which developed on iatrogenic origin.

Second case, female, white, married, 58, referred to us 12 years ago with a diagnosis of a peripheral facial paralysis. Examination of this highly emotional individual and subsequent developments revealed the following: 1) peripheral facial paralysis; 2) diabetes mellitus; 3) arterial hypertension; 4) osteoarthritis of

the fingers; 5) spondylitis rhizomelica; 6) severe osteoarthritis of both knees, with free intraarticular bones in the joint cavity of the l.s. (subsequent surgical removal); 7) nephrolithiasis attack over the right side; 8) nephrolithiasis attack over the left side; 9)

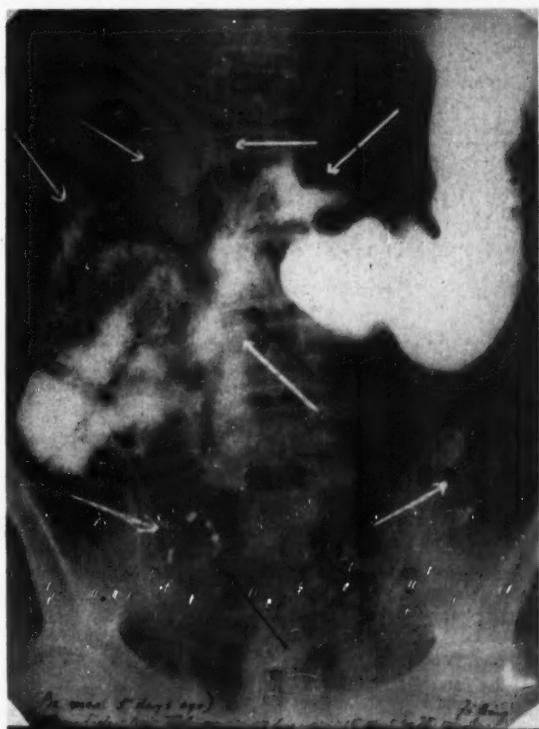


Fig. 9, Case III: Arrows point to the presence of 1) duodenal bulbar deformity; 2) duodenal malrotation; 3) jejunal malrotation; 4) appendicular stasis (5 days); 5) colonic diverticulosis; 6) double gallbladder.

location of huge stones in the right kidney pelvis; 10) cholelithiasis (gallbladder studded with stones, giving negative shadows); 11) huge and massive pleuropulmonary fibrosis over the right side.

This large series of pathologies, all of acquired nature, caused surprisingly few symptoms and then only intermittently or for short periods such as 6 above, prior to surgical removal; 7 and 8 for a matter of hours, until the attacks were aborted; and 1 during the acute stage.

Although any of these pathologies may have been a material cause to produce a series of complaints, in the present case, however, the aggregate total remained symptomless or produced out of proportionally little suffering. However, this patient was a chronic complainer. The complaints were unrelated to these pathologies; they resulted solely from her neurosis.

Third case. F. E. D., a very high strung white female of 41, suffered from intermittent epigastric pain at rare intervals, during the past 5 years. X-ray examination revealed a deformed duodenal bulb, without niche. The deformity represented a minus sign, a bulbar retraction on the lesser curvature side. After clinical improvement the deformity retained its unaltered shape. Relapses occurred at three occasions within 18 months. These disappointing recurrences in spite of apparent clinical cures, prepared the ground for the patient to finally agree to a more thorough work-up, which patient has hitherto restricted only to the study of the gastroduodenal segment. This resulted in the establishment of the fol-

lowing radiographic findings: 1) bulbar deformity; 2) malrotational congenital duodenal anomaly; 3) malrotation of the jejunum; 4) appendicular stasis (the right sided location of the appendix designated the jejunal malrotation as incomplete); 5) extensive colonic diverticulosis (unusual findings at this age); 6) huge redundancy of the colon (the splenic flexure loops represented well over half the length of the entire colon); 7) unusual degree of ptosis of the colon (unusual, as it did not fit into the rather sthenic habitus pattern); 8) double gallbladder, suggestive of a bifid type.

The discovery of all these congenital anomalies, a surprise finding, cast this problem of the deformity of the bulb in a fresh light. Shape and permanence of the deformity, and the circumstance that clinically no typical duodenal ulcer was in evidence and also the association with the congenital anomalies brought up the question whether the bulbar deformity could not be grouped with the other seven anomalies into one category, constituting a group of malformational anomalies, all stigmata of a constitutional inadequacy. Explanation of this situation, with the emphasis on expressing the possibility that patient's suffering



Fig. 10, Case III: Barium enema. Note the huge ptosis, in a sthenic habitus. Huge redundancy of the splenic flexure area.

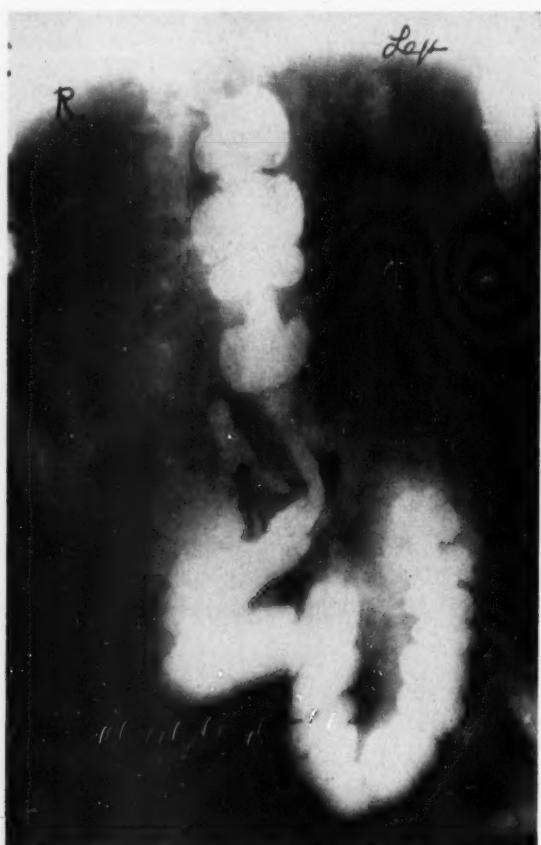


Fig. 11, Case IV: Left inguinal hernia. Note the distal half of the colon in the hernial sac, which is of the size of a man's head. The narrowed segments represent the colon in the inguinal canal. The lateral connection leads into the hernial sac; the segment, medially located leads from the hernial sac into the rectum.

might have developed on a psychosomatic ground, or on the basis of developmental congenital anomalies, acted magically to relieve her anxiety state. Since the patient's worry always centered around the existence of the ominous peptic ulcer, now for the first time hope could be expressed that the suffering was not necessarily due to a duodenal ulcer. Since that date (about 20 months ago), this patient experienced no further recurrences of her painful attacks.

In this case eight congenital anomalies were incidentally detected during routine work-up. At least seven out of eight abnormalities ran a symptomless course. The intermittently recurring painful periods, as a singular complaint, appeared to be due either to a structural bulbar process or to an associated neurosis, developed on the ground of a constitutional disposition.

Fourth Case, B. U. T., male, married, mulatto, 62, developed intermittent episodes of breathing difficulties, with cough and wheezing. He was otherwise in perfect shape. This patient had an inguinal hernia over the left side of the size of a man's head, containing the larger distal half of the colon. He had huge stones in the left kidney pelvis, several large stones in the bladder and the prostate was studded with stones (prostatic lithiasis). The prostate was infected and its massatum contained W.B.C. and their clusters in huge amounts. There were severe osseous changes of a progressive spondylitis rhizomelica.

The hernia did not cause even a minimal constipation. The prostatic infection and stones located at least in three different organs did not cause the slightest



Fig. 12, Case IV: Arrows point to the presence of 1) two huge stones in the left kidney pelvis; 2) stones in the bladder; 3) prostatic lithiasis; 4) spondylitis rhizomelica.

complaints or disturbances, not even an occasional nightly urgency at any time. The severe spondylitis remained symptomless.

Usually any of these pathologies may develop in its course a series of complaints and much suffering. Here, even their sum total failed to elicit any. There were no symptoms now, nor at any time before due to these pathologies. The respiratory disturbances on a cardiovascular basis with a hypertensive man caused moderate symptomatology in the traditional manner and of transitional nature, yielding promptly to medical treatment.

Fifth case, R. E. T., a male, white, 65, with a weight of over 225 lbs., and a height well above 6 ft., was in a state of anxiety. Patient's only concern was his health; fear and anxiety for its preservation. Essential hypertension: blood pressure 205/110 mm. Hg.; E.C.G. normal. Extensive colonic diverticulosis. Appendicular stasis. Congenital duodenal anomaly. None of the pathologies caused patient any symptoms. All his



Fig. 13, Case V: Congenital duodenal anomaly. The first portion is elongated. The duodojejunial junction is behind the pylorus.



Fig. 14, Case V: Film taken 10 days after barium enema. Extensive colonic diverticulosis and a persistent and isolated visualization of the appendicular lumen (appendicular stasis) are still visible.

complaints derived from neurosis, which, in association with the congenital anomalies, was expressive of a constitutional inadequacy in a man of psychopathic personality.

Sixth case. F. T., female, married, mulatto, 60, a highly emotional, extremely nervous individual, much given to complaints, ten years ago developed essential hypertension, which has since progressively increased. Readings as high as 250/135 were recently recorded. Coronary occlusion, with myocardial infarction developed 2 and 3 years ago, resp., with typical E.C.G. changes of a posterior type. Atherosclerosis obliterans of the lower extremities, with extremely low oscillatory indices. Double gallbladder of bifid type. Solitary huge diverticulum of the duodenojejunal junction. Huge appendix, reaching or crossing the midline.

All these anomalies and pathologies existed without occasioning considerable complaints. In fact, this patient never felt more composed and tranquil than during the two episodes of coronary occlusion. However, she never was without complaints; complaints, which developed often in an absurd or grotesque manner, or in kaleidoscopic patterns. They were unrelated to the underlying pathology and originated from her neurosis. The observation, that the complaints in general appeared not impressively diminished even after the hypertension under rauwolfia effect gave way to perfect-

ly normal blood pressure readings, was a further indication that the complaints were unrelated to the underlying pathology.

Seventh case. T. S., female, white, married, 39, first examined VII/23 1940. This extremely emotional, at times nearly explosive patient suffered nervous breakdowns at intervals of a few years. On these occasions digestive complaints predominated and persisted for a short duration. In the intervening years she felt well and pursued her normal activities as a lady of leisure. In 1940, during the first examination this patient exhibited among several congenital anomalies, such as an inverted cecum with a subhepatic appendix, ptotic and atonic transverse colon, etc., also an unusual anomaly of the duodenum. Malrotation, inversion, redundancy and extreme mobility ("duodenum mobile"), with a mesoduodenum of the 3rd and 4th portions were diagnosed. The same findings were corroborated during a check-up in 1953.

All these congenital anomalies, in the presence of a constitutional disposition, remained symptomless throughout. The intermittently recurring digestive disturbances developed on a neurotic basis, for which the anomalies constituted only an appropriate setting.

COMMENTS

a) "*Mens sana in corpore sano.*"

This denotes in English a healthy mind in a healthy body, or that a normally built man has normal senses. Congenital anomalies denote abnormal developmental



Fig. 15, Case VI: Double gallbladder. The accessory vesicle is about one third of the larger chamber. On other films the two vesicles often superimpose. After fatty meal prompt reduction in size, although there is a reabsorption phenomenon for about 3 days.



Fig. 16, Case VI: Huge solitary diverticulum near the duodenojejunal junction. Prone position.

patterns. Usually they occur in combinations. They may affect any organ, tissue or any combination thereof. Some congenital anomalies in the abdomen may remain symptomless throughout life. Others may cause pain or give rise to various complaints, esp. if motor disturbances develop in later life. But, because constitutional anomalies are expressions of constitutional inadequacy, they, as stigmata, denote their carriers as potential neurotics, or emotionally unstable or unbalanced, or even as psychopathic personalities. Such individuals may and do develop symptoms or abnormal reaction patterns. Subsequently pain or other disorders in the presence of constitutional disposition or congenital anomalies should be weighed against such contingencies.

b) *Explanatory notes on olygosymptomatology.*

In some of the cases some explanation for the occurrence of olygosymptomatology may be offered. One of these could be an abnormal reactivity pattern. A *hyposensitive individual's reactivity* is slow, retarded, suppressed or diminished pattern. They react to the same stimulus or pain lightly, belatedly, or they may even fail to react. A negative Libman's sign, or any other device for the determination of the threshold value for painful stimulus may give some hint or indication of the presence of such hyposensitive state. This is a quantitatively opposite pattern to the emotional, hypersensitive or hyperreactive type, leaving the question unresolved, as to whether either pattern has greater significance.

In other cases certain specific symptoms of neurosis may be so dominant that they suppress any or all the symptoms which might be expected to originate with the anomalies or pathologies which are present.

In still other cases no manifest cause is detected. Incidental circumstances may occasion the olygosymptomatology. It may incidentally happen under certain conditions and with certain individuals that e.g. gallstones or kidney stones do not provoke any active stone attacks, or that diabetes, hypertension, arthritis, peptic ulcer or other diseases or combinations of dis-

eases remain symptomless or produce only slight discomfort to their bearers.

c) *Congenital anomalies vs. acquired pathologies.*

Besides congenital anomalies acquired pathologies or borderline developments between these two groups may often be present in association. Among them may be mentioned an appendicular stasis, or a cecal stasis, diverticulosis of the colon or of the jejunum, redundancy of the colon or of the duodenum, to mention only a few.

Because congenital anomalies are often the harbingers for the development of neurosis, psychosis, psychosomatic disorders and certain late development for metabolic, allergic or endocrine disturbances, their combined occurrence is relatively frequent.

d) *Constitutional inadequacy and anomalies.*

This is subject to variations. Entirely opposite characteristics may be the features. The common denominator is fittingly expressed by Osler, who stated that the "contractor put in poor materials." Alvarez describes two extremes. The one is the easily fatigued, the second is the indefatigable. Both may show endurance records. Among the geniuses characterized by him Charles R. Darwin and Robert L. Stevenson are the prototypes of these two extremes. In Alvarez' exposition lowered resistance, lowered working capacity, weaker physical status, bodily handicaps and great endurance are not necessarily incompatible. The constitutionally inadequate in diligent search for rehabilitation too often falls victim to the unscrupulous surgeon, and many unnecessary operations are being performed, often changing the status of the afflicted from bad to worse (Alvarez).

Bartel in 1916, describing the Phrygian cap in autopsy material, considered and described this anomaly as a sign of constitutional weakness and developmental retardation in early embryonic stages, often associated with additional embryonic defects, such as a Meckel's diverticulum, herniae, genital hypoplasias, etc.



Fig. 17, Case VII: Both films depict the unusual anomaly of the duodenum: malrotation, inversion, elongation. Barium meal. *Upright position.*

According to Kantor "anomalies may be regarded as expressions of organic constitutional inferiority, points of actual and potential weakness in the body structure." The general tendency of the system is to compensate for the presence of the anomalies. Hence symptoms do not develop until this compensatory mechanism breaks down. Associated neurosis furnishes the underlying functional instability. The break in the compensation mechanism and the anomaly furnishes the particular digestive symptomatology of the clinical picture.

Julius Bauer (1917) classifies the constitutional anomalies into morphologic, functional and evolutive forms. The first group embraces the congenital anomalies, including the extreme fetal monstrosities, teratomata, etc. The second group contains idiosyncrasies, chemical malformations, or congenital malformations in body chemism (alkaptonuria, etc.). The third group deals with problems such as infantilism, senilism or their unique association in progeria (Gilford), a combination of evolutional and involutional constitutional anomalies (Kiernan, Bauer). Either of these anomalies may effect the individual individually or in relation to a heredofamilial disposition pattern, which may develop in families even generations apart. The epithet of congenital anomalies as descriptive as "the somatic fate of the individual" (Tandler, Bauer), is invariably true and affixes the stamp of a "consummatum est," on its bearer.

e) *Analysis of a hypothetical case.*

One hypothetical case of a congenital anomaly, such as a "duodenal inversion" may serve the purpose. Whereas in our series "duodenal inversion" with many other anomalies remained practically invariably symptomless, in some of the textbooks the same topic may be described at great length, with a list of symptomatology. Let's analyze the same case, picked out at random, and see whence the apparent discrepancy?

One well known text book on Gastroenterology, (for understandable reason the author's name is omitted) gives the following description concerning the clinical significance of the "duodenal inversion": "Clinically there are no characteristic symptoms or signs. The symptoms are due to the delay in the passage of duodenal contents. Epigastric pain or discomfort, nausea, belching, and gaseous distention are the most prominent symptoms. Jaundice, diarrhea and so-called bilious attacks may occur. Vomiting and migraine headaches are associated with stasis. Peptic ulceration may be associated with this condition."

On analysis of this description one may readily agree with the first statement of this long paragraph, namely that there are no characteristic symptoms and signs. That should put a quietus to this description. The author of this characterization, however, following a hypothetical assumption takes for granted the existence of a complicating delay of the passage through the duodenal lumen. He describes the potentialities of whatever consequences this non-existent condition or pathology might have had on a hypothetical patient. This assumption begs the original question as to whether the inversion of the duodenum "per se" does or does not interfere with the motor power of this organ? The answer to this question would be an emphatic "no." There are no motor disturbances in inverted duodenum, and consequently no symptoms or signs referable to this anomaly. It stands to reason that if the duodenum instead of running its normal course in a counter-clockwise direction, takes a turn the other way around, and develops a congenital inversion, this in itself represents an immaterial turn of events, not implying any motor delay or even a tendency thereto.

Recently we compiled from our files a list of 12 cases of congenital anomalies of the duodenum, a larger part of them having showed duodenal inver-

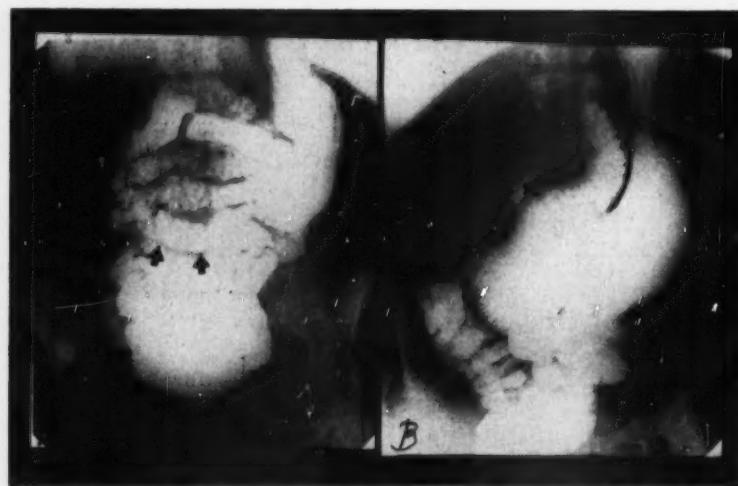


Fig. 18, Case VII: A) Barium meal, *Prone position*. Film taken in 1953. The duodenum, due to free mobility and redundancy of the 3rd and 4th portions turns downward, without the signs of malrotation and inversion.

B) *Upright position*. Duodenal inversion and elongation. Film taken in 1940. Cecum is inverted. The appendix is subhepatie; it points upward and is located close to the duodenum (arrow).

sion, complete or partial. In none of these cases was there any sign, symptom, or indication for the development of any motor disturbance.

f) *Significance of congenital anomalies.*

It is not merely an incidental occurrence if someone is born with polydactilia, hermaphroditism, undescended testicles, or a cleft palate. These are signs of visible, structural pathology of congenital origin. Other congenital anomalies, just as obvious, though hidden in the abdominal cavity, may, unless diagnosed, remain unnoticed throughout life. Agenesis or duplication of a gallbladder, or of the appendix, malrotation of the intestines, or some of its segments, redundancy of the colon, duodenal anomalies, etc., are some of the known anomalies of this group. Both groups represent common stigmata of a heredodegenerative state.

The congenital anomalies of the duodenum are, as are other congenital anomalies of other organs, stigmata, usually expressive of a constitutional inadequacy. The presence of an inverted duodenum automatically stigmatizes its bearer as a constitutionally inadequate personality. A constitutionally inadequate man may develop various symptomatologies, even in the absence of any manifest developmental anomaly. And so it may happen, that, whereas a man with a duodenal inversion remains fully symptomless, another individual, constitutionally equally inadequate, may develop symptoms, in the absence of any duodenal inversion, which incidentally may even resemble those described by others to be characteristic, if not pathognostic for an inverted duodenum.

For illustration reference is made to the 12th case of our series of congenital duodenal anomalies. This refers to a young female who suffers from a depressive psychosis. This patient in free intervals feels and acts normally. During the depressive cycle she becomes despondent. Among many other symptoms her G.I.T. is in constant revolt, and anorexia, nausea, distaste to food, unsubstantiated food allergies, weight-loss, epigastric pain, flatulence and other kaleidoscopic patterns of symptoms and complaints make their appearance.

After temporary recovery all her digestive symptoms disappear, although the congenital duodenal anomaly is permanent. That proves that the symptoms of the G.I.T. are not due to the presence of the congenital duodenal anomaly, but they develop, in their presence, on the basis of a neurogenic mechanism.

CONCLUSIONS

In contrast to the polysymptomatic diseases the significance of their antithetic case, namely the scanty symptomatology in anomalies and pathologies, has been stressed.

By a few case reports the inverted ratio between cause and effect, i.e. disease and its symptoms, has been illustrated.

The role of neurosis, developing on the same constitutional basis of the congenital anomalies, has been emphasized.

Cases were cited in which in the presence of congenital anomalies and acquired pathologies, symptoms, if present, were referable to an associated neurosis.

Effort has been made to define or identify some of the known or suggested causes in cases with oligosymptomatology and to correlate such symptomatology to causative factors.

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ALTERNATE OCCURRENCE OF CECAL HYPO- AND HYPERDESCENT IN THE SAME INDIVIDUAL. ITS MECHANISM REPORT OF TWO CASES

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OBSERVATIONS are offered below regarding certain positional anomalies of the cecum in the kaleidoscopic redundancy pattern. The cecal positional changes were recorded by radiography.

These observations revive the old, controversial and long disputed issue of "cecum mobile" and add some new elements to its nosography. In this latter condition the lateral motion and mobility of the cecum is diagnostic. The cecum, in left lateral position, naturally swings out medially, approaching the midline. Also the examining physician may mechanically induce a degree of mobility of the cecum by manipulation. Vertical changes, if any, are delegated to a secondary role. In this presentation we are not concerned with such

lateral mobility, nor with any movement resulting from positional changes. "Cecum mobile" was often associated with cecal hyperdescent, but not with hypodescent or non-descent.

The subject is the hypo- and hyperdescent of the cecum. These two contrasting states are ordinarily representative of both the clinically and radiologically strikingly different aspects of the hypersthenic and asthenic habitus. Their alternate appearance in the same individual is liable to confuse, if not obliterate the distinctive features as they exist between these antithetic states.

In the two cases presented here observation was made of the cecal hypo- and hyperdescent and their

alternation in the same individual. These observations, with a possible explanation of the underlying dynamics of this phenomenon, are presented here.

CASE REPORTS

First case. A. P., female, white, married, 31, was taken ill at the end of 1951. She developed some abdominal distress, with pain and discomfort. Her physician advised appendectomy. When the symptoms did not abate, he added the indication of a cholecystectomy. Loaded with operative suggestions patient was referred to us for diagnosis. As both the appendix and the gallbladder were found to be free of pathology, operation was called off. Four months later complaints recurred in a somewhat different appearance. At this time it was relatively easy to detect and diagnose an enlarged, prominently bulging right kidney which on x-ray examination exhibited the characteristic picture of multiple cystic kidney. During ureter catheterization a kink at the ureteropelvic junction was noted. At operation all these findings were corroborated. The kink caused by bands at the ureteropelvic region was considered by the surgeon to be a congenital anomaly. The right kidney, double its usual size, was completely transformed into multiple cystic cavities, leaving hardly any normal cortical renal tissue. This was the picture of a maximal hydronephrosis due to a congenital mechanical obstruction.

The ureteral kink did not cause any trouble during the first 31 years. Only when the degree of the angulation increased as a result of the sheer weight-apposition of the pathologically enlarged and heavier right

kidney, and as obliteration of the lumen completely interrupted the urinary outflow, did symptoms develop.

During the work-up, prior to a final diagnosis, barium enema examination was made and this disclosed a redundancy in the sigmoid and the splenic flexure region. The hepatic flexure showed some unusual conglomeration of the loops. The degree of redundancy was not considered excessive. The cecum was high and apparently it was a *hypo-descendent cecum*. The picture of the radiographically demonstrated cecum fundamentally changed when viewed after the oral opaque meal. Six to 24 hrs. following this meal the cecum was found in a *hyperdescendent position*. This appeared to be a congruent part of a general ptotic pattern which was now disclosed. The discrepancy between these cecal patterns was so startling that it seemed hardly understandable. Whereas the cecum ascendens and a part of the transverse colon on the enema picture appeared in an unusual shape of convoluted masses, the coils in festoon shape huddled in the right hypochondrium, the design after the oral meal fundamentally changed. Here, the elongated cecum ascendens of a normal shape and hastration was found in a deep hyperdescendent position. The transverse colon ran in a true straight transverse line without angulation or festooning. Its oral segment was spastically contracted and appeared in a filiform design. These findings were corroborated upon repetition of this examination.

Second case. H. A. K., female, white, 34. At the time of examination, in 1946, she was suffering from severe abdominal pain for ten hours. Her past history revealed that she had normal bowel habit and was not suffering from constipation. She underwent operations for the removal of her normal appendix, for the suspension of her womb and opening an ovarian cyst. Flat plate revealed air pockets of a tremendous volume. Upon administration of barium enema a huge redundancy of the sigmoid was detected. The sigmoid, after describing a circle in the left pelvis, swung into a second, huge, migratory circular course and crossing the midline reached the right acetabular region. This second extralooping showed not only extra length but also a markedly widened lumen, descriptive of the x-ray appearance of a megasigmoid. *Megasigmoid and redundancy of the sigmoid* were aligned in a combined occurrence. After partial evacuation the tremendous distention of the redundant loops receded, leaving behind the markings of the pathological loops in a collapsed state, in a most unusual pattern.

During the maximal distention following barium enema the cecum was found *high and undescended in the subhepatic area*, close to the costal margin. Following a partial bowel movement the cecum descended and was found in *hyperdescent*, with normal shape and hastration.

COMMENTS. DISCUSSION

a) Cecum mobile.

In the human, the cecum is capable of some degree of mobility in any direction. This is partly due to the circumstance that the cecum remains unattached



Fig. 1, Case I: Barium enema. Redundancy of the splenic flexure and sigmoid. Hypodescent of the cecum. Note the reduplicated loops in the hepatic flexure area.

to the abdominal parietes on a wider surface, and partly to the fact that the lower part of the cecum is intraperitoneally situated, possessing free mesentery. In the animal kingdom many mammalia exhibit extreme degrees of hypermobility, so that the cecum may be found at any part of the abdomen. The appendix which is closely attached to it shows still larger deviations, esp. at birth when it forms with the cecum a common and undivided cavity. The appendix may be missed or found rudimentarily developed in certain carnivores, whereas in herbivores rarely it may attain a length surpassing the body length of the species (Rauher-Kopsch).

"Cecum mobile" in the human represented one of the most controversial and disputed problems in Medicine, esp. during the first quarter of this century. Hausmann established its clinical entity. Wilms developed a surgical treatment for its cure. If, following an appendectomy, pain or discomfort in the right lower quadrant of the abdomen persisted, cecal fixation became an accepted procedure in many clinics. But not in all, and not for very long. Wilms considered the free mobility of the cecum as the cause responsible for failure in appendectomies. He attributed the mobile cecum to be the result of chronic constipation developing on the basis of backpressure by gases formed in the constipated colon. He claimed a 40% cure after cecopexy. This concept was widely challenged. Hofmeister ingeniously devised an operation based on the opposite principle, namely by freeing the cecum on a still larger basis, thereby enhancing the mobility of the

mobile cecum. He claimed equally good results. Consequently it became increasingly evident that the right lower quadrant syndrome was not due to the free mobility of the cecum.

Cecal mobility was frequently found associated with hyperdescent, stasis, dilatation, catarrh and constipation. Even establishment of an anatomical basis for the explanation of sensitivity to pain perception in appendicular processes, and its degrees has been attempted (Miloslavich). Stierlin, also Klose, called attention to the constitutional elements and their role in explaining the development of the anatomical changes in mobile cecum, typhlatology, high-, low-, and inverted cecum. This seemed to be the most constructive contribution towards the restoration of order and system in this complex field.

In mobile cecum the degree of mobility is gauged by the mesial approach of the cecum toward the midline in the left lateral position. The vertical swings, if any, were generally unreported or considered insignificant. The generally accepted method of Schwarz served to classify the cecal mobility (Schlesinger, Assmann, Stierlin, Meyer, etc.). First an orthodiagram was taken of the ceco-colon during fluoroscopy in the upright position. Then the same procedure was repeated in the left lateral position. The lateral displacement of the ceco-colon on the orthodiagram determined the presence and degree of mobility. Normal figures did not exceed $2\frac{1}{2}$ cm., values of 3 cm. and higher indicated mobile cecum. In extreme mobility the cecum in the second orthodiagram approached or crossed the midline.

Critical comments included observations regarding the limited value of the clinical determination of the mobility esp. in the stout and hypersthenics, as well as the rigidity of the standards in the roentgenological classification. Mobile cecum was not a clear-cut clinical entity. In its presence often though not necessarily an associated hyperdescendent cecum was found. The latter was either a solitary finding or constituted a part of a general coloptosis. Hausmann, also Wilms often found free mobility conjointly with hyperdescent. Jordan emphasized the frequent association of the mobile cecum with redundancy of the splenic and sigmoid loops, which latter, upon reaching into the right pelvic fossa, threatened to frustrate the potential good result of colopexy. Stierlin often noted distention associated with mobile cecum. Distention was considered an accompaniment to cecal stasis by Klose, Stierlin, also Case. Fischler underlined the frequent occurrence of catarrhal state and atony. Payr considered the role of cecal mobility secondary to an obstructive pathology of the splenic flexure area with retrograde backing up in the cecal segment.

b) *The high cecum. (Non-descent and hypodescent).*

The high cecum results from embryonic arrest in development. After completion of migration and rotation, the cecum arrives at the right hypochondrium and thereafter it descends to the right iliac fossa. This descent may be arrested at any stage. Arrest occurs either from a premature fixation, or is unaffected by it. In case of a too early fixation, the ascending and proximal transverse colon may require additional space for their uninterrupted development and may create a festoon shaped reduplication pattern. The cecum



Fig. 2, Case I: Barium progress meal. 24 hrs. film. Distal colon partially evacuated. Oral half of the transverse colon spastically contracted to a filiform design. (Note arrows). Cecum in deep hyperdescent. Well hastrated ceco-ascendens.

may appear in an inversion shape or the undescended cecum often actually turns out to be a truly inverted cecum.

Robust, stocky, hypersthenic males are predominating. Rarer occurrence of appendicitis is a feature. In its presence the incidence of "pus-appendix" is relatively high (Kantor). Jordan saw this abnormality always associated with motor disturbances of the terminal ileum, a concept not generally accepted.

c) *The low cecum (hyperdescent; dystopia coeci inferior, Brosch).*

Kantor regards the low cecum as an overgrowth rather than a simple hyperdescent or ptosis. Women of hypo-, or asthenic habitus predominate. Vomiting, headaches and right lower quadrant sensitivity are the triad usually attributed to cecal hyperdescent and encountered in these constitutionally inadequate and emotionally unstable individuals. Such habitually complaining individuals often fall victim to unscrupulous surgeons and Kantor considers that these patients constitute the most frequently and unnecessarily appendectomized group. The removal of the fully normal appendix is frequent and the true "pus-appendix" is rare among these cases.

d) *The cecal congenital anomalies in general.*

The high and low ceca are counterparts to each other and represent diametrically opposite pictures in both the clinical aspect and interpretation as well as the radiological appearance. There are no compromises or reconciliations between the two groups, resp. their clinical interpretation.

In spite of this seemingly rigid classification and in-

terpretation nevertheless they both are of the same significance, denoting different patterns of a similar constitutional anomaly. Their distinguishing feature is their opposite prefix, a plus and a minus sign, respectively.

The low cecum according to Kantor represents the most frequent anomaly of the colon. He found an 18% incidence (284 among 1,581 cases). He classifies the clinical symptoms as toxic and reflex. The toxic effects are explained on the basis of their dynamics as they refer to kinking, dragging and the mechanical obstruction brought on by an abnormally deep cecum. The reflex symptoms are explained on the basis of an associated neurosis.

The high cecum is much rarer. Harvey found a 3% incidence of the subhepatic localization and a 6% frequency of the incomplete descent. The subhepatic cecum in infants (under 3 months) was encountered in 6% among 1,050 cases. This difference concerning the subhepatic localization would suggest that this condition is truly a congenital anomaly and at least half of these infant subjects will develop a descent of their ceca, complete or partial, sometime during the ensuing years of their life. Kantor and Schechter found only 3 cases among 1,049 patients subjected to roentgen study.

A 10% incidence of mobile cecum was found by Engel in 1857 in his obdication material, and also by Wandel during the obdication of 640 cadavers. The 18% incidence of low ceca would indicate that all or most mobile ceca are or may be in a hyperdescent position, but not all the cases of hyperdescent show free mobility. In fact, Case pointed to the occurrence of inflammatory adhesions of the cecal tip, which kept the hyperdescent cecum immobilized.

Curschmann, Brosch, also Stierlin generally agree with the concept and incidence of the mobile cecum. Often but not invariably they found it in combination with hyperdescent. A hyperdescent cecum proved to be either an isolated development or it fitted into the picture of a general coloptosis.

Curschmann found his "floating cecum" responsible for volvulus when it occurred in this region. Klose disagreeing with this concept considered the pathologically adherent or fixed cecal tip more frequently responsible for the development of volvulus or obstruction.

Prerequisite for the development of free mobility is a long, free and movable mesocecum. Dreicke found a common mesentery for the cecum and terminal ileum in 23% of the cases of "cecum mobile." In extremely rare cases a developmental anomaly of a "common mesentery" persists for the small and large intestines.

Holotopy, skeletopy and syntopy of the cecum differ in the various anomalies of the position. This difference assigns the various positional patterns into differing groups, while their common constitutional basis with its clinical significance groups them together.

The various anomalies of the cecum (low, high, inverted, mobile) are variants in the same family. This family is characterized by neuropathic constitution, constitutional inadequacy and emotional instability.

e) *Redundancy patterns.*

Most of the cecal anomalies belong to the larger group of redundancy. The pattern of colonic redund-



Fig. 3, Case II: Barium enema. Redundancy of the colon. The sigmoid after describing a circle in the left iliac region, turns to the right side and appears in the form of a megasigmoid. Note the non-descent of cecum. Ceco-ascendens is missed.

dancy is variable. Films obtained after barium enema, and those secured after evacuation of the bulk of the barium emulsion and especially after barium meal, reveal, by comparison, substantial changes in their redundancy patterns.

Films obtained after barium enema are best suited for the study and diagnosis of the morphology of redundancy. The oral method permits the study of the colonic function. The design of redundancy on films obtained after the oral method is always effaced or even may be missed entirely. Occasionally the opaque material leaves in its trail some markings. In other cases gas-pockets, with or without barium remnants in them or in a "knuckle" at an unusual location may hint of the presence of redundancy.

The design of redundancy may differ greatly on repeated barium enema studies. The greater the tortuosity of the convoluted loops the greater are the changes which may be expected. In extreme cases even the location of the redundancy may change. Extra loops to the right of the descending colon may on a succeeding occasion be located on the opposite side of the descending limb. Or, a splenic redundancy pattern may straighten out hours subsequently and the sigmoid region may develop a new redundancy. A precondition to these extreme changes is an extremely long mesentery. *The greater the redundancy, the closer its resemblance to the small intestinal pattern.*

All these unusual and grotesque morphological changes are not explanatory of the difference in pat-

terns and their interchange in the cases as reported herein. Here, at first glance, the reproduced variations seemed to have fundamentally changed from the constitutional pattern of a hypersthenic to that of an asthenic type.

DYNAMICS. THE POSSIBLE EXPLANATION

There appears to be some similarity between the dynamics affecting both cases. The question arises whether both or only one of the two diametrically opposed patterns are to be considered normal or typical? If so, which is the typical pattern for the case and under what conditions can a change be affected? How can these opposite designs be reconciled and explained?

For the explanation of this unusual phenomenon at this time only a working theory can be offered. Redundancy of the colon entails the redundancy of the mesocolon. Colonic redundancy could not exist in the absence of a redundancy of its supporting matrix, the mesocolon. Mesocecum constitutes a part of mesocolon. Frequently (in 23% of mobile cecum) the cecum has a common mesentery with the small intestine, permitting free movability of the ceco-ascending cylinder. A very important part of the mesenteric or mesocolic foldings is its smooth musculature, which is, however, not an invariable constituent (Rauber-Kopsch). This, if present, permits active movement and contraction of any of its muscular segments.

If the distention of the redundant distal colon engages the greater portion of the mesocolon, i.e. if the distal end of the colon elongates, its proximal segment, the ceco-ascendens must *compensatorily be shortened*. Barium enema, especially under increased pressure distends the redundant loops and produces the changes aforementioned. Therefore, during and following a barium enema while the greatest part of the mesocolon is drawn to the left, the ceco-ascendens will be retracted, as if drawn in by reins, and pulled up to the right hypochondrium. This action is purely a passive procedure. The retraction of the cecum may be aided by active muscular contraction of the mesocolon, or of some part of it. The abnormal, unpleasant and repulsive stimulus of a rectal enema, esp. with certain individuals, may automatically or reflexly evoke defense movements, such as, among others, a contraction in the muscular elements of the mesocolon might be. In the first case the cecum was retracted and drawn up, the ascending and proximal transverse segments became compressed into a festoon shape in the hepatic flexure region. In the second case the entire ceco-ascending cylinder practically melted away and became absorbed into the subsequent parts of the colon.

As soon as the distention subsided the redundant mesocolon became disengaged, thereby serviceable again to the entire length of the colon. This occurred and was observed following evacuation of the barium masses, or the oral barium meal. If the cecum was "ab origine" hyperdescendent, the extra folds and creases of the redundant mesocolon make the descent of the cecum to its destined location possible.

A precondition to this free maneuverability aside from the long and redundant mesocolon, is a movable cecum free of any adhesions. Jordan, also Bockus, noted



Fig. 4, Case II: Post-evacuation film after barium enema. Note the collapsed redundant loops. Some segments still contain barium in measurable amount. The distal colon is faintly visualized through its mucosal outline. Note the deep hyperdescent of the cecum. Ceco-ascendens is elongated and well hastruated.

that there is a frequent association of hypodescent of the cecum with redundancy of the splenic and sigmoid loops. Under such conditions the redundant loops fill in the empty space left free in the right lower quadrant, as a result of high position of the cecum. Kantor and Schechter were not very receptive to the acceptance of this association and its explanation. Our observations in the two cases would indicate that such association may exist, however, its explanation must be sought the other way around, namely that the primarily distended and redundant distal colon secondarily affects the cecum, causing its shortening and retraction.

A hypodescent cecum cannot change into a hyperdescent or mobile cecum. A hyperdescent cecum remains, as a rule, likewise unchanged. However, in case of redundancy in the distal colon there is a possibility that it may under certain temporary conditions change into an apparent hypodescent. The two preconditions are, 1) a marked distention of the aboral half of the colon, following a barium enema, and 2) free movability of the ceco-ascendens. If one does not evaluate such possibilities, a hypodescent of the cecum after a barium enema may wrongly be interpreted. The information obtained after a simple barium enema may be misleading. Only a complete work-up and its correct interpretation can properly solve the problem. In this way the unusual occurrence of hypo- and hyperdescent can be explained in both of our cases.

SUMMARY

Two cases are presented in which *hypodescent* of the cecum was demonstrated on films obtained after barium enema.

The films obtained following evacuation after barium enema and following a barium progress meal respectively revealed the cecum in a *hyperdescent* position.

A working theory is presented for the explanation of this unusual phenomenon.

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RELATIONSHIP BETWEEN SPHERICAL GALLBLADDER AND HYPERSTHENIC HABITUS

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THE DETERMINING factor in the variability of the position of the gallbladder, as first pointed out by Sherwood Moore, lies in the particular make-up or habitus of the individual. In each habitus there is generally a characteristic position, size, shape and tonus of the gallbladder. The relation of the bodily habitus to the visceral shape in the gastro-intestinal tract brought out by Mills, (originally by Carman and Mills) served as an incentive to S. Moore, who further elaborating on the question of relationship postulated that the same principle applies with equal force to the relationship between bodily habitus and gallbladder shape. It was the conclusion of Francis Davies that heavy hyperstenics must have their gallbladders in high horizontal position, producing on the film a circular or oval shadow. The gallbladder shape and the bodily type seemed to be so thoroughly in-

terdependent, that Graham expressed the view that "should one encounter a gallbladder image of one type in an individual of dissimilar type, the problem of interpretation would be hard to solve. We have not met this." While this statement sounds logical and generally correct, exceptions to this rule are very numerous, even without implying that exceptions are the rule.

The relationship between habitus and gallbladder shape was fairly generally, though not universally accepted as proven, since these early days. A few quotations of well known textbooks on this topic are illustrative:

Lyons describes the gallbladder, without any reference to habitus, as "pear-shaped or modified cylindrical vessel" type.

According to Bockus: "the shape of the gallbladder

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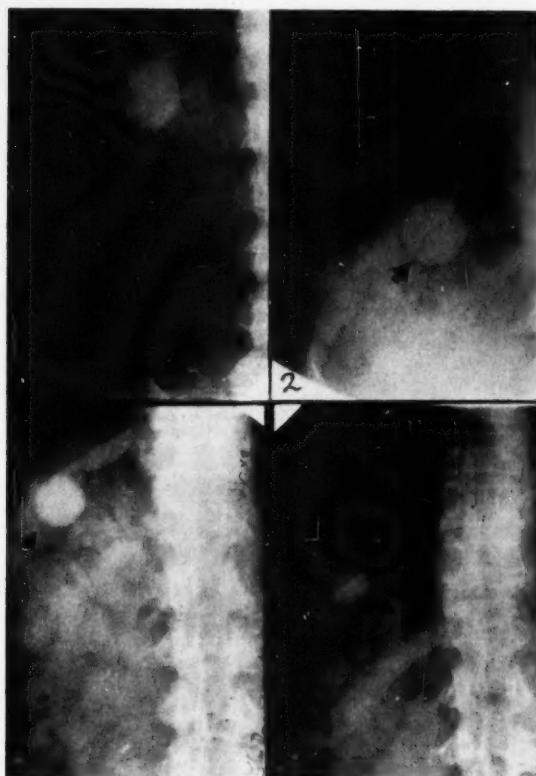


Fig. 1, Case I: Films taken 5 years ago. No. 1 and 2 (upper row) represent gallbladders, taken during repeated examinations. Visualization by Priodax. No. 3 and 4 (lower row) are post-prandial films, 30 minutes after the fatty meal.

depends in part, upon the habitus of the patient. The organ tends to be circular in subjects of the habitus hypersthenicus, pear-shaped in those of habitus sthenicus and finger-shaped in patients of the asthenic habitus. Obviously the shape of the gallbladder also depends upon the direction of the x-rays. Direction of x-rays may cause the gallbladder to appear foreshortened, or small, or circular."

Buckstein finds that the "shape of the gallbladder varies from circular to pyriform. Gallbladder position varies with the general body architecture. In the hypersthenic it is usually globular and high."

Walters and Snell characterize it as "ordinarily pear-shaped," without making reference to body architecture.

Samuel Weiss describes the gallbladder "pear-shaped or modified cylindrical vessel shaped." No reference is made to habitus.

Feldman claims that the "shadow is oval, pyriform, or pear-shaped; in the sthenic or hypersthenic person it is oval or round."

Shanks and Kerley state that: "in stocky or short obese individuals and in most children the gallbladder tends to be more rounded and to be fixed more completely in the hepatic fossa. In some cases the whole of the gallbladder is actually embedded in hepatic tissue. It is then seen radiologically as a completely round opacity."

From this description it does not seem clear, how and why a hypersthenic gallbladder should have the tendency to develop an intrahepatic localization, furthermore, how and why an intrahepatic localization, considered a congenital developmental arrest, should change the shape of the vesicle "into a completely

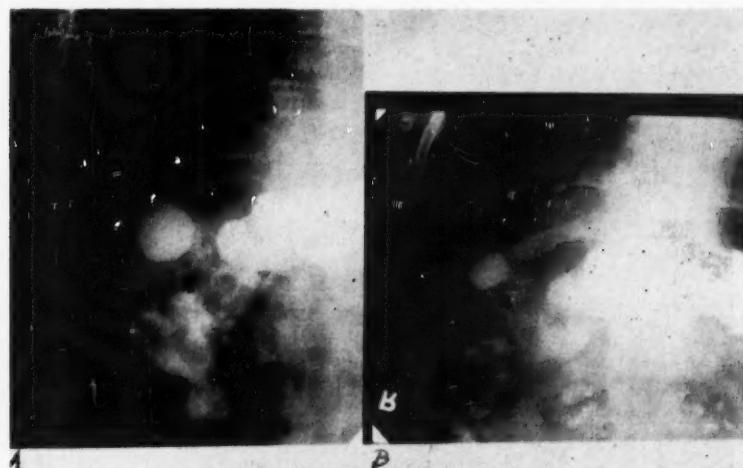


Fig. 2, Case I: Films taken in 1953. Spherical gallbladder and its relation to the duodenum. Visualization by Telepaque. Barium mixture added to the Boyden meal, enables one to study the relation of these two organs. A) Film taken antecenam. 2) Post-cenal film.



Fig. 3, Case I: Spherical gallbladder and "twin" jejunal diverticula visualized simultaneously. Film taken in 1953.

round opacity"? A hypersthenic gallbladder is not synonymous with an intrahepatic vesicle, and an intrahepatic localization "per se" does not make a gallbladder round.

INCIDENCE OF "SPHEROID" AND "SPHERICAL" GALLBLADDER

The question "sub judice" is, whether there are hard and fast facts to prove that a gallbladder can appear in a truly "spheroid" or "spherical" shape. As above quoted, the larger proportion of textbooks seem favorable to this concept, regardless whether this represents the authors' own observation, or it represents merely a matter of convenience and this concept is simply accepted as truth from previously existing textbooks.

If the gallbladder of the hypersthenic is truly spheroid or spherical, then according to the law of

averages such gallbladders are expected to occur among all the gallbladders approximately in similar percentage, as hyperstenics are represented among all the cholecystographed patients. This is, however, not the case. Perusal of textbooks offers convincing evidence. Portrayal of hundreds of gallbladders, normal and pathological, reveals the startling fact that a spheroid or spherical shape is hardly ever found among them. Forms vary between the ovoid and fingershaped varieties, and refer mostly to the pyriform pattern. No pathologies are demonstrated on spherical gallbladders, as spherical gallbladders are practically non-existing, or are only extremely rarely demonstrated.

Anatomical descriptions depict the gallbladder as "pear-shaped" and even among its rare varieties no spherical form is mentioned (Rauber-Kopsch).

Experienced surgeons who come across large num-

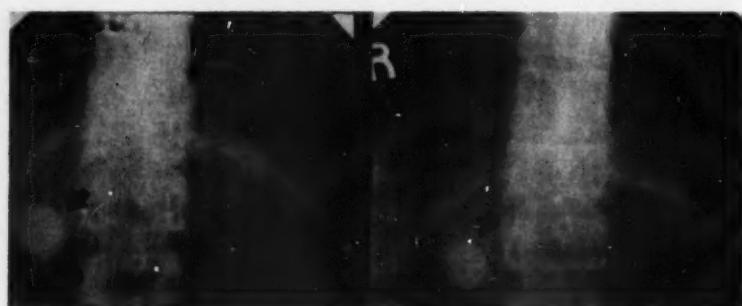


Fig. 4, Case II: Spherical gallbladder, pre- and post-prandially. Six years ago the gallbladder was normal.

bers of normal and pathological gallbladders (usually once in each case, except in the case of double gallbladders), are unaware of the existence of spherical gallbladders.

BODILY ARCHITECTURE. VISCERAL PATTERNS

Early investigators were aware of the fact that constitutional factors may have their imprint upon the shape of the gallbladder, just the same as they have on the gastro-intestinal tract. Since B. Stiller in the early part of this century established the clinical entity of "asthenia universalis congenita," stigmatized by the demonstrability of the "costa decima fluctuans," the importance of the constitutional elements and their significance in diseases steadily grew in consequence. Tandler on the basis of the difference in the muscle tone differentiated the hypertonic from the hypotonic type and considered Michelangelo as the master-painter glorifying the hypertonic types, with Botticelli immortalizing the hypotonics on their canvases (Tandler, J. Bauer). Eppinger and Hess, basing the classification of the various constitutional types on the response of the vegetative nervous system, described the clinical picture of vagotonia, a contrast to sympatheticotonia. Julius Bauer elaborated on the classification of the human into four types, i.e. those of the respiratory, digestive, muscular and cerebral varieties as conceived by Sigauds, Chaillou and Mac Auliffe. Mills in 1917 recognized the different visceral patterns in the gastrointestinal tract in relation to bodily construction and formulated the two main groups, those of the hypersthenics and asthenics with their subgroups of the sthenics and hyposthenics, respectively. Emilio Schlesinger's classification of the gastric patterns into four groups, namely the hyper-, normo-, hypo- and atonic types, was along similar lines and fitted well into the design of Mills' classes, which covered the larger field of gastro-enterology. S. Moore in 1925 tried to employ a similar formula in regard to the shape and tonus of the gallbladder and its constitutional types and formulated that the gall-

bladder of the hypersthenics must be globular or ovoid shape, in contrast to the deep, narrow, descended and ptotic type of the asthenics.

PRESENTATION OF FOUR CASES WITH SPHEROID OR SPHERICAL GALLBLADDER

First case, W. J., male, colored, 54, developed certain not clearly defined digestive disturbances during the summer of 1948. Few months later, when first seen, we found: a past history of lues, acquired 30 years ago; moderate essential hypertension; tortuosity of the ascending aorta; prominent arch; electrocardiographic changes characterized by ST-2 and ST-3 depressions, inverted T-2 and T-3, slurred QRS-es; albumen traces in the urine; negative Kolmer reaction.

X-ray examination of the gastro-intestinal canal showed a small sized transverse stomach of hypersthenic type, with smooth, flat and downward pointing duodenal bulb. In the upper jejunum, but quite some distance from the duodenojejunal junction, two diverticula were detected, quite close to each other, in "twin" form, and in the size and shape of small chestnuts. The gallbladder, visualized by Graham Cole's method, showed a strictly globular appearance. The geometrically precise spherical shape did not change even after post-cenal contraction. In spite of the prompt post-cenal reduction in size, the gallbladder, after regaining its original size and sharp outline, remained visualized for five days. No doubt, this was due to reabsorption phenomenon. The shape of the vesicle remained invariably strictly spherical during repeated follow-up examinations. Positional changes from prone, to right and left oblique, and lateral positions did not affect this shape. The direction of the x-rays, in relation to the gallbladder did not affect the shape either.

In the case of the spheroid or spherical gallbladder, during the "preparatory phase," i.e. after the intake of the fatty meal, but prior to noticeable vesicular contraction, no erection, axis change, elevation, or partial torsion of the viscus or of its long axis is expected to be observed, or to be noticeable (Shanks and



Fig. 5, Case III: The gallbladder is spherical (A) to ellipsoid (B). The gallbladder of this patient was ovoid, 15 years ago.

Kerley, Albot et al.). The cystic and other extrahepatic biliary ducts were never visualized, giving no inkling as to their possible course or whereabouts. A recheck in 1953 fully corroborated the findings of 1948. The weight of this hypersthenic patient varied between 185 and 215 lbs., at a height of 69 inches.

Second case, N. P., male, white, 23, a neurotic and stammering young man, who for the past ten years suffered from painful digestive disturbances, without any specified morphological change, such as ulcer, etc. The gastro-intestinal canal revealed unusual rapid emptying, the barium rushing through the stomach, duodenum and small intestines without a moment's pause. X-ray examination of the gastro-intestinal tract and that of the gallbladder was otherwise negative. At an examination, six years later, the gallbladder revealed during roentgen study a perfect ball shape. The viscus retained this spherical shape also after the Boyden meal. The markedly reduced shape and sharp visualization testified for good functioning power. The cystic and the other ducts remained non-visualized. This patient had a normal, somewhat hypostenic habitus, with a weight of 125 lbs., at a height of 65 inches.

Third case, C. F., white, married, female, 50; this moderately thyrotoxic and extremely neurotic individual showed an ovoid gallbladder, situated parallel to and at the level of the edge of the liver. During a repeated examination, 15 years later, the gallbladder exhibited a spheroid shape, which on certain films

alternated with an ellipsoid form. This patient had a normal habitus. She weighed 125 lbs., at a height of 58 in.

Fourth case, J. U. L., mulatto, female, married, 42. Roentgen examination revealed a perfectly normal, pear-shaped gallbladder. However, the infundibular segment developed marked contraction 5 to 15 minutes after a fatty meal. The sharp contraction completely obliterated the lumen of the infundibulum, neck and cystic duct. The remaining fundus and body of the vesicle assumed first an ovoid form, then went through a spheroid stage, finally becoming fully spherical. Repetition of the entire process resulted in identical findings. It was evident that contraction of the infundibular circular musculature was instrumental in producing the spherical change of the fundic part of the gallbladder. This patient had a normal habitus. Her weight was 135 lbs. and her height 65 in.

THE GALLBLADDER TYPES IN HYPERSTHENIA

For comparison the x-ray films of the gallbladders of four consecutive hypersthenic cases are presented.

The first case (J.G.) refers to a plethoric, heavy, muscular type of hypersthenic man. Age 58, weight 235 lbs., height 68 inches. He had no abdominal complaints. He suffered from essential hypertension, which started over thirty years ago. Blood pressure reached figures of 240/135 mm. Hg. The gallbladder in this classic case of hypersthenia showed an oval shape in high position. It was slightly hazy, in spite of the fact that an x-ray technique 5 to 8 times stronger than the average gallbladder technique was needed for its visualization; an indication of the degree of hypersthenia.

The second case (H. J.) refers to a muscular type of hypersthenic male of 55, with a weight of 165 lbs., and a height of 65 $\frac{1}{4}$ inches. The stomach appeared short, high and transverse, the duodenal bulb tilted downward. The gallbladder was normal, pear shaped, slightly above average size. Dye concentration and post-prandial contractions were normal. On the post-cen film, the contracted gallbladder appeared close to a finger-shaped design, usually seen in hypostenics. There was a certain incongruity between habitus and gallbladder shape, a challenge to the (Graham's) postulate.

The third case (W. O. L.) a female of 50, a short, stocky, broad-shouldered subject, who exhibited a hypersthenic type of stomach. This, in fact, was not only transverse, it was inverted. There was a non-descend of cecum. The gallbladder harbored a diverticulum at its fundic tip. The gallbladder was of average size and sharply angulated. Post-prandially it contracted and appeared of perfectly normal size and pear-shape, a pattern of a normal habitus. No spheroidal tendency was noted on any of the films. Her weight was 160 lbs., her height 63 inches.

The fourth case (E. M.) is that of a short, stocky, heavily-built female of 42, exhibiting the bodily characteristics of a hypersthenic. She suffered from intrahepatic lithiasis, with hardly any abdominal complaints. Roentgen examination revealed a perfectly normal gallbladder in a slightly higher location. Dye-concentration and post-prandial contraction were normal. The vesicle was ovoid, without signs or tendency

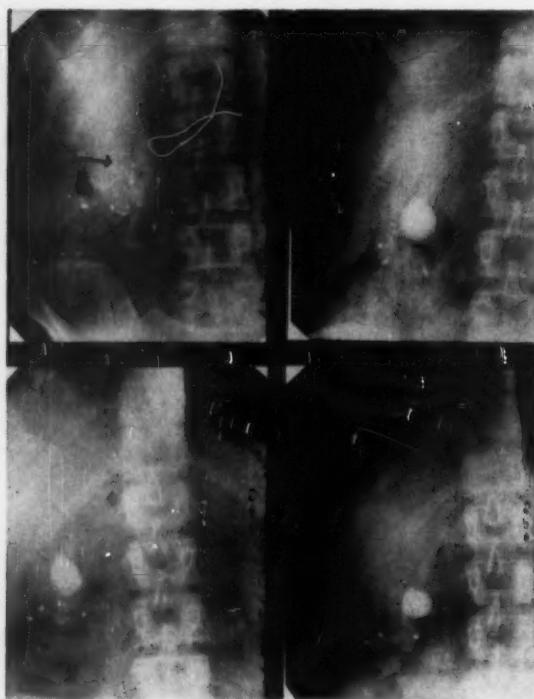


Fig. 6, Case IV: Normal pear-shaped gallbladder, during post-prandial contraction, 5-30 minutes following the Boyden meal, shows gradually developing spherical configuration of the contracted gallbladder.

of rounding. Her weight was 195 lbs., and her height 64 inches.

INFLUENCE OF VARIOUS FACTORS AFFECTING SHAPE AND SIZE

With an unchanged height and position of the x-ray tube the direction of the rays to the body surface remains constant, and only insofar as the gallbladder changes its axis towards the rays will a change of the shape, size and position of the vesicle take place.

During the "preparatory phase," i.e. after the ingestion of the Boyden meal, but before the stage of active contraction, the sphincter closes (Ivy), the vesicle pulls itself together (Shanks and Kerley), and the "erection stage" of Albot, Toulet, Bonnet and Moullart develops. During this stage the tonus increases, the long axis of the vesicle turns with its fundus outward and upward, and the physiological vesicular erection angle registers a degree of 5 to 15. The erection becomes more pronounced in the more elongated and ptotic vesicle. In ovoid, and especially in the spheroid or spherical gallbladders no such angular changes are expected to develop. The long axis does not undergo any change during the preparatory phase nor during contraction or emptying. The changes in the vesicular erection pattern are best demonstrated in the horizontal posture, in side-view exposure, according to Albot et al. The degree of straightening of the gallbladder can be used for appraisal of the effort of contraction (Albot et al.). Contraction and evacuation are not identical and do not have to

go parallel. A parity or disparity between them is of diagnostic import.

The changes in the dye concentration and particularly the post-cenal contraction do not result solely from the state or the disorders of the contractile mechanism of the gallbladder. The latter can be normal and the concentration and contraction still may be impaired. This is not necessarily due to intrinsic diseases or disorders of the viscus, but can be conditioned also by extrinsic factors, such as a faulty preparation of the subject for the Boyden meal.

As fat is the most potent agent of gallbladder contraction, fatless diet will keep the viscus in a state of physiological stasis, or inertness. If fat has been withheld for a day or so, and the vesicle is filled with concentrated bile, the dye or the dye laden bile will not be able to enter such overdistended gallbladder. For that reason it is of great importance to properly prepare the patient for the dye intake, in order that this should reach the vesicle in a relatively empty state. Consequently, the patient must be instructed to take plenty of fat with his last meal, 2 to 3 hours prior to the dye intake. Shanks and Kerley emphatically call attention to this simple desideratum. Its importance is enhanced by the fact that the prevailing tendency is to forbid or restrict the use of fat prior to the dye intake.



Fig. 7, Case IV: Repeating the series of x-ray examination similar development is noted. The spherical shape of the contracted vesicle is due to infundibular muscular contraction.



Fig. 8, Control Case I: Pliethoric male, with hypersthenic habitus. Weight 235 lbs., height 69 inches. Gallbladder is oval shaped.

The dye filled gallbladder, upon fatty meal, promptly contracts. Contraction takes place even before any fat left the stomach, or reached the duodenum. Gutmann and Nemours-Auguste, as stated by Shanks and Kerley, made such observation possible by adding a small amount of barium to the Boyden meal. As the presence of fat retards the evacuation of the stomach, the barium, in the presence of fat, may be retained in the stomach for a longer period. By this method it can be demonstrated that at the moment, when the fat, in intimate mixture with the opaque barium emulsion, is still in the stomach, with no part of it having entered the duodenum, the gallbladder might already have reached the state of contraction.

THE MECHANISM OF GALLBLADDER CONTRACTION

Two mechanisms are at work in accomplishing gallbladder contraction. The overdistended gallbladder may, due to resiliency or elastic recoil, contract to a limited degree, without any muscular action. Such action is considered to be due to the role of the fibro-elastic layer contained in the body of the vesicle. Apparently the body of the gallbladder is not furnished with muscular layers, only fibroelastic tissue is substituted for it. This does not result in complete contraction or evacuation. For the accomplishment of full contraction the active role of the smooth muscular elements is needed. The fundus and the infundibulum are supplied with smooth musculature. In the fundic part it runs in longitudinal and oblique direction,

whereas in the infundibulum and neck it assumes a transverse or circular course. Only muscular contraction can produce complete evacuation. Dependent upon whether the fundic or the infundibular musculature is primarily participating in the act, the resulting contraction, and the effect on the emptying of the vesicle can be quite different. Whereas the preponderant action of the former is to forward, the preponderant action of the latter is to retard the evacuation of the viscera.

COMMENTS

The gallbladders of hyperthemic individuals may show actual shortening and widening of the vesicle in certain cases, producing an ovoid shape, besides occasional fore-shortenings as a result of perspective. No spheroidal, still less spherical shapes are seen to develop. In many cases, the gallbladders of the hyperthemic do not differ in shape and size from those of the normal habitus.

True spherical gallbladders are extremely rare. Four cases are presented here. The first case is most remarkable, inasmuch as the spherical gallbladder rigidly preserved its ball shape under varied conditions and influences. Repeated serial examinations, pre- and post-prandial exposures, positional changes, etc., did not produce the slightest variation in the globular appearance. Although in this single case the spherical form coincided with hyperthemic habitus, the etiological correlation between the two remains open to question. In the second case of a somewhat hyposthenic young male, a truly spherical gallbladder was similarly demonstrated, both, pre- and post-prandially, although six years earlier the gallbladder was found to have been normal. In the third case, in contrast to the normal, ovoid type, found 15 years earlier, the gallbladder

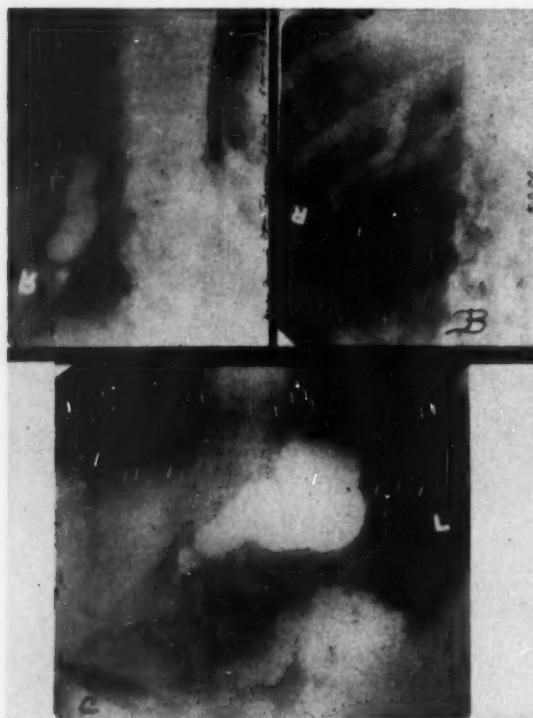


Fig. 9, Control Case II: Hypersthenic male. The stomach is typical of a hypersthenic habitus (C). The gallbladder is pear-shaped (A); on the post-prandial film (B) it is finger-shaped; rather a characteristic of a hyposthenic body build.

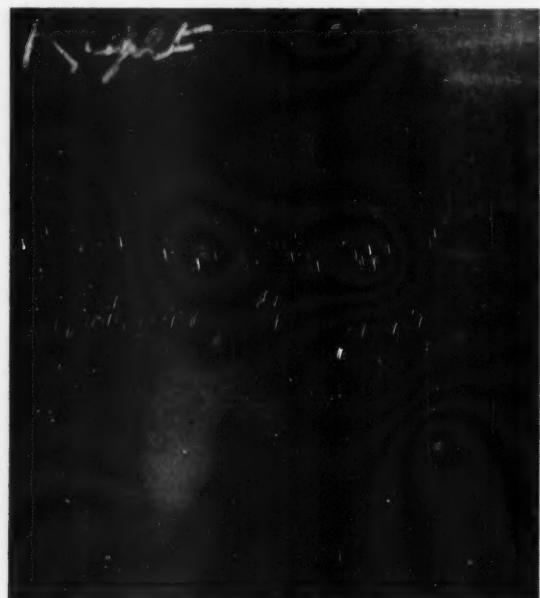


Fig. 10, Control Case III: Hypersthenic female; gallbladder is sharply angulated; it is pear-shaped. Note a diverticulum at the fundic tip.

appeared in spherical to ellipsoid shape. In the fourth case the originally pear-shaped gallbladder changed before our eyes into a spherical type. This could be demonstrated and reproduced at will. This observation showed an etiological correlation between the contraction of the infundibular smooth musculature and the development of a spherical gallbladder. This observation seems to this writer to be of heuristical significance, as this seems to be the first time that spherical shape developed during observation, with a hint to a true etiological correlation between the two factors, as aforementioned. Only one among the four cases presented was associated with hypersthenic habitus, whereas the other three exhibited perfectly normal body architecture.

The question whether the spherical gallbladder is only an x-ray image of an otherwise normal, pear-shaped, or ovoid gallbladder, a bidimensional projection of a tridimensional object, or if it represents a truly spherical organ, is of great interest. It appears that in the first and second case the organ is actually spherical in shape. In both, especially in the first case, the globular form, as demonstrated on the films, is ex-

pected to express the true form of the viscous. Probably in the third case, and certainly in the fourth case the gallbladder is expected to appear in non-spherical form. In these cases the spherical shape represents a functional, and not a morphological state.

SUMMARY

True spherical gallbladder, or even its spheroid variant, is rare.

Four cases of spherical gallbladder are reported. The constitutional type of hypersthenic habitus occurred only once among these cases. The three others exhibited perfectly normal habitus patterns.

The gallbladder shape in four control cases of hypersthenic habitus was found to be normal. With the exception of one ovoid form, average pear-shape was found in the remainder. No spherical, not even spheroid configuration was present, nor was there even a tendency thereto, noted.

No corroborative evidence of any correlation between vesicular shape and constitutional hypersthenic habitus could be established in this series.

In one case of this series the spherical shape developed before our eyes, during a post-cenal contraction period. By obliterating the lumen of the proximal part of the viscous, the contracted infundibular musculature passively produced a spherical configuration of the body and fundus, a shape which a fluid-filled sac would take up under pressure.

No clear-cut explanation can be offered for the development, or for the existence of the spherical configuration in the other cases.

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Fig. 11, Control Case IV: Hypersthenic female. Weight 200 lbs., height 64 inches. Gallbladder is ovoid. Diagnosis: intrahepatic lithiasis. Note the clusters of stones laterally and below the gallbladder shadow.

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ABSTRACTS ON NUTRITION

MEULENGRACHT, E.: *Treatment of pernicious anemia with very small quantities of pyloric mucosa and vitamin B₁₂*. Brit. Med. J., April 10, 1954, 838-841.

Very small doses of dried pyloric mucosa from hog stomach given alone exert a definite but substandard anti-anemic effect. The small amounts of mucosa combined with ordinarily ineffective amounts of vit. B₁₂ exert a practically standard anti-anemic effect. A commercial preparation (Cycoplex mco) in daily doses of 0.15 gms. dried pyloric mucosa and 15 micrograms of vit. B₁₂ exerts a strong anti-anemic effect. In the routine treatment of pernicious anemia patients, in order to be on the safe side, a dosage is recommended which corresponds to 0.3 grams of dried pyloric mucosa and 30 micrograms of vitamin B₁₂ for the initial doses. The maintenance dose has yet to be decided.

RIVIN, A. U. AND DIMITROFF, S. P.: *The incidence and severity of atherosclerosis in estrogen-treated males, and in females with a hypoestrogenic or a hyperestrogenic state*. Circulation, IX, 4, April 1954, 533-539.

Autopsy records of estrogen-treated men, castrated women, and women with breast cancer were analyzed with reference to the degree of atherosclerotic disease. Findings were then compared with those in similar groups of men and women whose estrogen supply was considered normal. Results obtained suggest: (1) that the male treated with estrogen has less atherosclerosis than the normal male, (2) that the oophorectomized female has an incidence of severe atherosclerosis approaching that of the male and (3) that the hyperestrogenic female with breast cancer has less atherosclerosis than the normal female.

JACOBI, HARRY G.: *Nutritional standards, organization and management of summer camps for diabetic children*. J. Clinical Nutrition, 1, 5, 384. July-August 1953.

Complete integration and cooperation of the Medical and Physical activities program is necessary for successful operation of camps for diabetic children. Food allowances of most of the campers were arranged under five basic diets which aided materially in the actual serving of the food to a large group of children. The success of such a camp program depends upon careful preliminary screening of applicants to

decide on dietary intake and insulin dosage. All usual insulin dosage is routinely reduced by approximately 30% for the first 24 to 48 hours of the camp stay. A well-arranged program of camp activities allowing for sufficient freedom of choice by the individual camper has been found to be most successful. Cost analysis of daily food consumption at camp per child showed it to be \$1.17. Psychological evaluation studies were attempted for the first time on these children, with rather encouraging results.

Franz J. Lust.

NISSIM, J. A.: *Toxic reactions after intravenous saccharated iron oxide in man*. Brit. Med. J., Feb. 13, 1954, 352-356.

Mild or moderately severe reactions following the I.V. injection of saccharated iron oxide in man have been reported rather too frequently. There is both an early type and a late type of toxic reaction. The early type occurs within the first 10 or 15 minutes, the late type in about 5 or 6 hours. One of the common types of early reaction is an anginoid pain in the chest and arms and/or pain in the back. Allergy may have something to do with producing such reactions and Nissim suspected the sucrose used. He states that reactions are greatly reduced by using "analar" sucrose, also by making up the injectable solution just before use. Delayed reactions are due to precipitation of the compound, e.g., in the lungs. (He does not go into the problem of figuring the needed dosage, nor to such possible late effects as hemosiderosis in cases receiving too much iron).

GANDEVIA, B.: *The association between hypoglycemia and myocardial infarction*. Med. J. Australia, Jan. 9, 1954, 33-36.

In a consecutive series of 50 cases of recent myocardial infarction proved at autopsy, 6 subjects were found to have had an antecedent hypoglycemic episode at approximately the time of the onset of the infarct. In a series of 55 diabetic patients who came to autopsy, the incidence of antecedent hypoglycemia was found to be significantly higher in those who had died from myocardial infarctions than in those who had died from other causes. A search of the literature leads to the conclusion that hypoglycemia, probably acting indirectly by producing an increase in cardiac work, may be a factor in the production of myocardial in-

farction, angina pectoris and some cases of cardiac neurosis.

Fox, E. G., FYFE, W. M. AND MOLLISON, A. W.: *Galactose diabetes*. Brit. Med. J., Jan. 30, 1954, 245-6.

Galactose diabetes is a rare, inborn error of galactose metabolism. Few cases have been described. In some of the cases, in addition to galactose, the urine contained amino acids. The essential features of the disease are failure to thrive, dating from the neonatal period, hepatomegaly, albuminuria and galactosuria. Serum bilirubin commonly is elevated and clinical jaundice may be present. Nuclear cataracts sometimes occur. Bouts of fever may occur over periods of 2 to 7 days. Exclusion of galactose from the diet by feeding a lactose-free diet is the essence of treatment. When this therapy is begun early, the manifestations of the disease are largely reversible, but when diagnosis is delayed, the prognosis is poor. In the case presented by the authors, no gross aminoaciduria was found. At autopsy, the liver, which was enlarged three-fingers below the costal margin, showed diffuse monolobular cirrhosis. Incidentally, the identification of the reducing substance in the urine is a somewhat formidable laboratory procedure.

FARRER, K. T. H.: *The nutritive value of yeast extract*. Med. J. Australia. Jan. 14, 1954, 67-71.

The nutritive value of yeast extract lies in its vitamin content, which makes it a useful dietary supplement, in its assimilable protein derivatives, particularly lysine, which improve the value of bread (as spreads) and the high flavor which has an "interest value" in certain invalid diets. Yeast extract is almost equal to meat in its content of the 12 essential amino-acids. Bread is good but is low in lysine. Protein synthesis in the body, and the retention of nitrogen for growth, require the simultaneous presence of all the essential amino acids. Yeast extract is the richest dietary source of B-complex.

COLLINS, I. S.: *The pathogenesis of pernicious anemia*. Med. J. Australia, Jan. 23, 1954, 114-117.

Collins gives an excellent review of pernicious anemia, and his article gathers together a great deal of recent data on the pathogenesis, which indicates how very complicated the subject still remains. Megaloblastic anemias are prevented by vitamin B₁₂ or folic acid, both of which are essential for the maturation of erythrocytes. Folinic acid probably is the active form of folic acid within the body. Vitamin B₁₂ is the extrinsic factor of Castle, available, in pernicious anemia, only in the presence of intrinsic factor. There probably are extra-gastric sources of intrinsic factor. Folic acid is deficient in most of the megaloblastic anemias except pernicious anemia. When used in

P. A., folic acid exerts a "mass action" and depletes the body still further of its vitamin B₁₂. Several theories have been offered respecting the final synthesis of nucleic acid but none are yet totally acceptable.

THOSTESON, G. C.: *Diabetes and pregnancy*. Harper Hosp. Bull., II, 6, Nov.-Dec. 1953, 245-247.

Primiparae and multiparae who have had diabetes for only a short time may have normal, vaginal deliveries, provided there are no obstetrical contraindications and the conditions for induction appear suitable. Patients with diabetes of over 5 years' duration are candidates for elective Cesarean section since, in the series of cases considered, there was a fetal loss of 8 percent compared with a loss of 25 percent by the normal vaginal route. Loss by vaginal delivery increased appreciably with greater duration of diabetes. Thosteson says that the results with hormonal therapy were inconsistent and unimpressive. Factors assuring the diabetic of a successful gestation are adequate control of the disease and careful timing of the delivery.

EVANS, P. R. C.: *Value of strict dieting, drugs and "Robaden" in peptic ulceration*. Brit. Med. J., March 13, 1954, 612-616.

"Robaden" is described by the manufacturers as protein-free extracts obtained from the stomach and small intestine of freshly slaughtered young animals. Evans did not find that it did any good in treating peptic ulcer. He feels that diet is important but that mental and physical relaxation is extremely important in assisting the natural tendencies for remissions to occur.

STEVENSON, C. A.: *The development of the colon examination*. Am. J. Roentgen., Rad. Ther. and Nuclear Med., 71, 3, March 1954, 385-397.

In a lecture commemorating the late Preston M. Hickey of Detroit, a pioneer in radiology, an interesting account is given of the gradual development of gastro-intestinal roentgenology and particularly the air-contrast barium enema. Today radiograms of the colon following double-contrast media, are capable of making positive diagnoses on a wide variety of lesions.

STEVENSON, C. A. AND WILSON, M.: *Indications for the double contrast colon examination*. Am. J. Roentgen., Rad. Ther. and Nuclear Med., 71, 3, March 1954, 398-403.

Except where disease of the terminal ileum and/or cecum and ascending colon is suspected, double contrast examinations may be done on all patients. Where the former conditions are suspected, then complete roentgenoscopy, and roentgenograms before and after evacuation are indicated.

EDITORIAL

ULCER AND DIET

It is still heresy to permit the patient with peptic ulcer to use a free diet, but nevertheless it sometimes happens that a patient who is full of symptoms on a restricted diet will become much more comfortable if permitted to eat what he chooses. Coffee and alcohol are known to stimulate the secretion of hydrochloric acid, yet I have one patient with a very chronic duodenal ulcer who, during the past twenty-five years, has consumed more than a pint of whiskey a day. It is true that his ulcer has not healed but it is also true that he is continually comfortable and able to work hard as an automobile mechanic. No doubt the relief of mental tension produced by the cerebral effects of alcohol have more than outweighed the acid-stimulating effect of ethyl alcohol.

Certainly, while we cannot recommend alcohol in

peptic ulcer, there is a growing feeling among internists that, *in certain patients*, at least, a more or less free diet seems to do good. The effect may well be merely the acquisition of an encouraging new freedom for the patient and it may depend, in part, upon gaining better nutrition, particularly from the natural sources of vitamin C and the flavones. I think most physicians are ready to agree with Stewart Wolf (1) who found that condiments were not very stimulating to the stomach of a fistulous patient, but that emotions evoked by stressful situations were extremely effective in producing heightened gastric activity. Where a stressful situation can be corrected, more good will result in ulcer patients than from all other modes of therapy.

1. Wolf, S.: A critical appraisal of the dietary management of peptic ulcer and ulcerative colitis. *J. Clin. Med.*, 2, 1, Jan.-Feb. 1954, 1-4.

BOOK REVIEWS

THE BILE PASSAGES. (LES VOIES BILIAIRES). Guy Albot and F. Poilleux. 290 pg., 170 illustrations. Masson & Cie, 1953.

This book is written in collaboration with other members of the Staff of the Hospital de L'Hotel Dieu in Paris. The main papers are presented by G. F. Bonnet, M. Champeau, M. Chiray, Ch. Debray, R. Dupuy, R. A. Gutman, J. Hepp, Cl. Houdard, Cl. Olivier, F. Poillet, J. Toulet, and, of course, G. Albot. The first part is devoted to internal biliary fistulae. Part two is devoted to the modern aspect of cholecystography, duodenal intubation and biliary radiomanometry. Other chapters deal with hypertonic stasis of gallbladder, cancer of the biliary tract, mechanical dyskinesias and the dysplasia of the gallbladder. Further topics are: medical and surgical conditions after cholecystectomy, pathology of the biliary tract and, cholecystotomy of Chiari and Pavel. The discussions of the principal papers are followed by case presentations of the staff of the hospital.

This book is in French, well written and illustrated, and gives us the conception of French gastro-enterology. Most of the authors are well known in America by their many publications. The entire field of gallbladder and extra-hepatic bile ducts is thoroughly covered. We recommend this book highly to gastroenterologists and surgeons.

Franz J. Lust.

SYMPOSIUM ON PROTEIN METABOLISM. The National Vitamin Foundation, Inc., 15 East 58th St., New York 22, N. Y., 1954. \$1.50.

Number 8 in the Nutrition Symposium Series, the present volume is a record of the proceedings of the Symposium held at the University of Toronto, Canada, on Oct. 30, 1953. The subjects considered are as follows—The relation of vitamin B₆ and riboflavin to protein metabolism; The interrelationship between vitamin B₁₂, steroids and proteins; The role of vitamins in antibody production; Effects of growth hormone preparations on protein metabolism; The amino acid requirements of man; Factors influencing amino acid utilization in tissue protein synthesis; and Amino acids and protein in therapy.

75 YEARS OF MEDICAL PROGRESS, 1878-1953. Edited by Louis H. Bauer, M.D. Lea & Febiger, Philadelphia, Pa., 1954.

Bauer makes the striking statement that in the past 75 years, medical scientists have learned more about the nature and treatment of disease, and about its prevention, than in the previous 3,000 years. Nineteen specialties are reviewed, each by an expert in his own field. Proctology wins a place in this collection but, strangely enough, gastroenterology does not, although it may safely be said that no specialty has so quickly formed itself into an intelligent discipline as digestive diseases in the past quarter century. We hope that the second edition of this worthy volume will do justice to gastroenterology. Even as it stands, however, Bauer and the contributors have produced an extremely interesting book, the publication of which was made possible by a grant from the A. H. Robins Co., Inc., of Richmond, Virginia.

GENERAL ABSTRACTS

O'BANNON, R. P. AND GRUNOW, O. H.: *Duodenal diverticular radiologic evaluation.* Texas State M. J., 50, 2, Feb. 1954, 81-87.

400 x-ray examinations of the gastro-intestinal tract revealed 22 cases of duodenal diverticulum. The majority occurred in the second portion of the duodenum. After 50 years of age the incidence increases. Although most diverticula are symptomless, they must be watched carefully for a possible secondary lesion.

ROWE, C. W.: *Less common manifestations of ulcerative colitis.* Texas State M. J., 50, 2, 88-92.

Rowe says that pseudopolyps occur in 10 to 15 percent of cases of ulcerative colitis, that involvement of the terminal ileum occurs in 20 to 28 percent, and that gastrocolic fistula is rare. These facts deserve more emphasis than they have received.

COMFORT, M. W.: *Gastric cancer: a problem of the internist.* Texas State J. M., 50, 2, Feb. 1954, 68-72.

It is up to the internist, particularly, to suspect gastric cancer, and to educate patients, so that earlier diagnosis may be made. Refinements in surgery will continue to improve the outlook for prolonged life, although it remains to be seen whether increased survival rates will compensate for the large number of ensuing nutritional and dumping problems. The patients most to be suspected and frequently examined specifically for gastric cancer are those with achylia, pernicious anemia and atrophic gastritis.

THOMPSON, J. E.: *Massive hemorrhage from the upper gastrointestinal tract: surgical management.* Texas State J. M., 50, 2, Feb. 1954, 73-80.

A blood urea above 50 mg. per 100 ml. on admission is a contraindication to immediate operation. In those requiring surgery, adequate blood transfusions are necessary prior to operation. Wound disruption occurs in 10 percent of cases operated upon. Gastrectomy is the operation of choice. Few cases require operation in the first 24 hours after admission. Some cases who recover under medical treatment should later return for operation. The surgical management employed by Thompson has reduced the mortality of massive hemorrhage from 1 in 5 cases to less than 1 death in 13 cases.

COPE, W. H.: *Epidemic of bacillary dysentery aboard a naval vessel.* U. S. Armed Forces Med. J., V, 3, March 1954, 345-349.

In an epidemic of 495 cases of shigellosis which recently occurred aboard a naval vessel, midshipmen and unrated men had, by far, the highest attack rate. An attempt was made to eradicate a potentially large reservoir of shigella infection by treating all personnel aboard that vessel, with or without symptoms,

with terramycin. Terramycin appears to be extremely effective in the treatment of patients with dysentery caused by *Shigella Flexneri* 2a, and has reduced the carrier rate to an extremely low figure. In spite of greatly increased emphasis on sanitation and habitability aboard vessels of the U. S. Navy, shigella organisms are still capable of greatly decreasing the effectiveness of these ships as fighting units.

ANDREU URRA, J.: *Metabolic significance of zinc.* Rev. Espan. Enf. Del Ap. Dig. Nutr., Vol. XII, 2, 198-203, March-April 1953.

The writer studies the metabolic role of zinc and its indirect influence on carbohydrate metabolism. He summarizes the most recent works recorded in medical literature concerning this point. The starting point for these works is the condition which Kadota named "dithizonic diabetes" and special emphasis is laid on zinc deficiency in the islets of Langerhans of the pancreas. He studies the analogies between this type of experimental diabetes and alloxan diabetes, and puts forward various points of view of these interesting problems of study.

CABRE, FIOL, V.: *Technic to procure samples of gastric mucosa cytology.* Rev. Espan. Enf. Del Ap. Dig. Nutr., Vol. XII, 2, 186-189, March-April 1953.

In order to obtain samples for the study of gastric cytology the writer uses a mandrin of the type used in duodenal catheterism with a button at its extremity covered with a rubber hood in order to prevent trauma. At 1 cm. from the tip it has some nylon-thread loops mounted on a plane vertical to its axis. The mandrin is introduced into a tube of plastic material firm enough to allow it to slide within the outer cover. Once the tube is inserted into the stomach, the mandrin is introduced further about two centimeters while the tube is held in its former position. This causes the loops to emerge from their protecting cover. The gastric contents are removed while fasting and the suspected zone is scraped by simply moving the mandrin backwards and forwards. Warm physiologic salt solution is then instilled and subsequently removed. When the tube has been removed, the loops are washed in the salt solution and the material exfoliated by means of Papanicolaou's method.

FERNANDEZ BASABE, E., MARTINEZ ROLDAN, C. AND PURAS, E.: *Hypochromic and macrocytic anemia due to parasitosis with "Anguillula intestinalis" simulating saturnine anemia.* Rev. Espan. Enf. Del Ap. Dig. Nutr., Vol. XII, No. 6, 585-596, Nov.-Dec. 1953.

The writers describe a case of uncinariasis due to the presence of strongyloides or Babay's Anguillula, the symptomatology of which was characterized by a gastrointestinal syndrome associated with enlarged liver and hypochromic anemia resistant to hepatotherapy. The intestinal flora study proved that a type

IV colibacillus-Proteus dysbacteriosis might probably be held responsible for the genesis of the gastro-jejunitis and colitis, which were evidenced roentgenologically and by examination of the stools, as well as for the induction of anemia.

Hepatomegaly and the positive results of various flocculation tests made the case reported herein similar to those described by Faust and associates in which, owing to migration of rhabdoid larvae to the liver, a hepatic condition ensued which in a case turned out to be fatal. In the observation reported by the writers of this paper the clinical course of the hepatopathy, once the parasitic organism had been eliminated and the normality of the intestinal flora re-established, was completely benign.

Even though hypochromic and macrocytic anemias do not seem to be a frequent complication of this type of intestinal parasitosis, according to the writers' opinion, they may be serious, as in the present case, and may even be associated with a marked erythroblastic and normoblastic response of the bone marrow, as is the case in hemolytic anemias. The excellent therapeutic results obtained with Tetrachloroethylene (Tetranil) and with hepatotherapy lead to the assumption that the anemia and abnormal response of the liver and intestine of the patient were parasitic in origin and that folic acid-vitamin B_{12} deficiency, conditioned by parasitosis, was aggravated by the disturbance in the intestinal flora which in its turn caused the requirements of these and other vitamin factors (especially A and C) to increase.

SWYNNERTON, B. F. AND TANNER, N. C.: *The achlorhydric patient with dyspepsia*. Brit. Med. J., Mar. 6, 1954, 546-552.

403 patients with achlorhydria have been studied chemically, clinically and gastroscopically, and many of them followed up for several years. The test meal used was the gruel meal, so that it is possible that if histamine had been used also, some of these cases might have secreted free HCl. There were 113 cases of advanced atrophic gastritis and 126 cases of chronic superficial gastritis. Gastric erosions or ulcers frequently were found. Over 90 percent of these patients complained of epigastric pain or discomfort usually relieved by eating. Over 25 percent gave a history of hemorrhage, and sometimes this was the only symptom. Less common symptoms were diarrhea, constipation, anemia, belching, regurgitation and dysphagia. Of associated conditions, gallbladder disease was the most important. In the late atrophic group no patient has developed gastric carcinoma. In the early atrophic group, 4 patients developed cancer of the stomach. Only one patient finally developed pernicious anemia. The discovery of gastric ulcer in the absence of Free HCl is a striking finding.

MONGES, HENRI, MONGES, ANDRE AND GARNIN-NICOLAS, H.: *Heartburn among pregnant women. Hiatal hernia and gastro-oesophageal regurgitation during pregnancy*. Arch. mal. app. dig. 42, 9-10, 1092. Sept.-Oct. 1953.

Heartburn often occurs during the last months of pregnancy. Authors' researches try to find out relationship between hiatal hernia and heartburn.

43 women complaining of heartburn during the last months of pregnancy were examined. 15 showed signs of hiatal hernia and gastro-oesophageal regurgitation. Hernia appeared in recumbent or Trendelenburg position and disappeared when the patient was upright. 10 patients showed no hernia but gastro-oesophageal regurgitation was observed in recumbent position.

In seven women the gastro-oesophageal regurgitation was not observed at first but only after drinking water when in recumbent position with the stomach being full of the barium meal. In 11 patients neither hernia nor regurgitation was found.

This study shows that most of the women complaining of heartburn during the last period of pregnancy have hiatal hernia or at least gastro-oesophageal regurgitation. Hence, in most cases, the gastro-oesophageal regurgitation, with or without hiatal hernia, is the pathogenic explanation of heartburn during pregnancy. Pregnancy is an important causative factor of hiatal hernia, which may be seen even when the patient is pregnant for the first time, more often after several pregnancies. These hiatal hernias disappear almost always after delivery. Mechanical and hormonal factors are responsible for hiatal hernia: high abdominal pressure caused by enlargement of the uterus and hormonal muscular atony of the stomach, cardia and lower part of the oesophagus. Sometimes the atony of the hiatal ring remains after delivery, especially when obesity plays the role of another causative factor of hiatal hernia, for instance at menopause.

SALEMBIER, Y.: *Functional disturbances of common biliary duct (Sphincter of Oddi excluded)*. Arch. mal. dig. Vol. 43, I. Jan. 54.

This work is based upon cholangiographic pictures made on 8 patients. 4 cases of hypotonia and 4 of hypertension are presented.

The diagnosis can be determined only in very precise circumstances. Passive dilatations of biliary tract above an obstacle of Oddi's sphincter (hypertonia or sclerosis) must be chiefly suppressed in this study. It is necessary to support the diagnosis upon the rate of pressure of the common duct: low in hypotonia, generally high in hypertonia.

All the cases concern operated patients and consequently in all of them, it has been possible to suppress every organic participation liable to explain any compression or broadening of the biliary duct. But these functional disorders are practically always discovered in an organic syndrome nearly always caused by the gall-bladder.

The syndromes of hypotonia generally concern the whole biliary duct whereas hypertonia chiefly appears as spasms limited to a part of the biliary duct corresponding to the pictures presented by Mirizzi as early as 1938.

The author has thought of supporting his cholangiographic statements which would show motility of the common duct by an anatomic and physiological argumentation.

Besides its own innervation, the biliary duct offers a musculature which, according to the sections (sections made at different stages on 8 corpses) appears as

placed in 2 strata, one longitudinal discontinuous, around this one are circular muscular fibers.

The physiological study made on the common duct taken from the guinea pig always showed a contraction in a solution of acetylcholine (2×10^{-6}). Decontraction was obtained with a solution of Teophylline Ethylene diamine.

Mirizzi drew therapeutic conclusions from these syndromes when they are connected with disturbances of Oddi's sphincter. It is difficult to propose treatments aiming at medical or surgical cutting of the sympathetic in case of hypotonia and of the Vagus in case of hypertonnia.

Therefore the study of the cholangiographic pictures presented shows disturbances which appear only in the common biliary duct. This one must have its functional autonomy and what has been aimed at in this work was to prove it once more by clinical, anatomic and experimental arguments.

LEVY, MAX, ET M. LAPIR: *Variation of the post-operative calcium*. Arch. mal. dig. vol. 43, 1. Jan., 54.

The physiologists Benedict, G. Lusk, Catheast, Herman, etc., have, in the course of a long-duration water-diet, carefully studied the variations of calcium in man; they demonstrated that—roughly speaking—nine-tenths of the lost CA comes from the bones. The daily calcium remains important during those 20 to 30 days of such experimental fasting.

The water-diet is not the only circumstance apt to bring about an increase of calciuria; bed-confinement increases azoturia, and it may double calciuria, and fecal calcium augments by one third. A bone fracture, with confinement, magnifies such effects. The evolutionary crisis of diabetes with acidosis evinces still more marked actions.

Despite the magnitude in the research work referring to the post-operative electrolytical perturbations, there practically exist no documents concerning calciuria.

The authors study it in the case of 58 operated patients in the course of the first 2 to 6 days following the operation when there practically exists no food supply and when there is no motion of the bowels.

Those subjects received on this day of the operation:

1 liter of salted physiological serum and subcutaneous 500 cubic centimeters of salted serum 4 per cent (20 g).

Then 30 gr. of the same serum distributed between the first and second day following the operation in intra-venous injections, a treatment which, in nearly all cases, annuls nitrogen post-operative disassimilation.

Urinary nitrogen and calcium have been remarked every day, which allowed us thus to be aware of which part of Ca came from soft tissue of catabolised protein nature and which from osseous tissues.

The data then gathered show:

1) The variability of the calciuria during 24 hours. The least is 21 mg, the most important 816 mg (av-

erage calciuria of the subject on ordinary mixed diet being 200 to 300 mg).

2) The considerable usual importance of calciuria with a bone origin.

3) The fact that age has no influence upon this phenomenon. An old patient (78) had nitrogenous and calcic losses which appeared as the smallest among all those noted.

4) The absence of any relation between azoturia and calciuria: for the same loss of nitrogenous material the destruction of Ca may vary from 1 to 10.

5) The variations of calciuria from one day to the other.

6) The absence of any relation between pre- and post-operative calciuria.

BECK, A., FOXELL, A. W. H. AND TURNER, W. C.: *An outbreak of food-poisoning due to Cl. Welchii*. Brit. Med. J., Mar. 20, 1954, 686-7.

Forty-four persons, in a general hospital, out of 360 persons at risk, suffered food poisoning from Cl. Welchii, contained in pork which had stood several hours after cooking before refrigeration. Diarrhea was the main symptom. Stool smears and cultures showed frequently almost pure cultures of Cl. Welchii and this organism was also obtained from samples of the pork. Twenty-three specimens of the micro-organism were of type I (Hobbs). Eleven specimens did not fall into any of Hobbs' types 1 to 10. The risk involved in the serving of meat dishes prepared the day before their consumption is emphasized.

BOLES, T.: *Postoperative pancreatitis*. Bull. Mason Clin., 8, 1, March 1954, 15-26.

A review of 10 cases of acute pancreatitis following upper abdominal surgery is presented. Five cases followed biliary tract surgery and five followed gastric resections. Injury to the duct of Santorini, trauma to the parenchyma of the pancreas, and interference with the pancreatic blood supply, are accidents which are of significance in this regard. The pathogenesis of the disease following biliary tract surgery is particularly difficult to understand. The whole subject is one which has not received sufficient study or experimental elucidation.

DORR, T. W.: *The roentgen diagnosis of gallstone ileus*. Radiology, 62, 3, March 1954, 363-367.

Gallstone ileus represents about 2 percent of all intestinal obstructions in adults. The diagnostic signs are, (1) signs of small bowel obstruction, (2) air, or contrast medium in the biliary tree, (3) absence or change of location of a previously noted gallstone or a gallstone shadow located in an area other than the right upper quadrant.

JEWEL, F. C. AND KLINE, J. R.: *The purged colon*. Radiology, 62, 3, March 1954, 368-371.

The x-ray pictures of the colon in persons habituated to the use of purgatives often show atonic, smooth appearances which closely mimic what is seen in ulcerative colitis. Purgatives keep the mucosa very edematous and efface the normal pattern.

CHILD SPECIALISTS QUESTION EARLY FEEDING OF SOLIDS TO INFANTS

The current trend of introducing solid foods to infants soon after birth (in some instances at two weeks of age) elicits little enthusiasm from some of the leading child specialists in this country. Nine of ten eminent authorities oppose this practice and question the scientific value of early feeding of solid foods; they see the trend as a reflection of a popular vogue; and they suggest possible psychological and physiological ill effects as a consequence of early solid feeding.

These views are brought out in a forum on "Trends in the Early Feeding of Supplementary Foods to Infants," conducted by Dr. Allan M. Butler, Harvard Medical School, and Dr. Irving J. Wolman, University of Pennsylvania Medical School, and published in the current issue of the *Quarterly Review of Pediatrics*. The forum centers on a nationwide survey in which more than 2,000 pediatricians have supplied data as to the age at which they introduce supplemental foods to normal infants and as to the kinds of foods they prescribe. Among other things, 59% of these pediatricians admitted being under heavy pressure from more than 50% of mothers of new born infants for early solid feeding.

Of ten leading authorities who were invited by the *Quarterly Review of Pediatrics* to comment on the survey all but one take a strong position in favor of breast milk or a milk formula diet for the first three to six months of a baby's life.

Among those who consider early solid feeding to be a current fad is Dr. Grover F. Powers, Professor Emeritus of Pediatrics, Yale University School of Medicine, who states that parents are a great influence in pressuring the pediatrician to prescribe such foods. According to Dr. Lewis Webb Hill, pediatric allergist, Harvard Medical School, if the baby is satisfied with milk and is thriving there appears "no advantage in adding cereal before the fourth month." In his opinion fruits such as apples, pears and apricots are of very little value except "to fill the belly and possibly to correct constipation if it exists."

Expressing the same view is Dr. Charles D. May, Head, Department

of Pediatrics, State University of Iowa Medical School, who contends that "the well-being of infants fed breast milk exclusively during the first six months of life has never been surpassed by an artificial or supplemental feeding regimen. . . . Adequate scientific information," he says, "cannot be presented to demonstrate the superiority of supplemental feeding of solids early in infancy over the feeding of acceptable milk formulas alone." "On the contrary," he adds, "infants who have developed the chronic digestive disorders known as 'celiac disease' are almost regularly restored to good health by the simple exclusion of cereal foods and other foods containing complex carbohydrates." And Dr. John A. Anderson, Professor, Stanford Medical School, San Francisco, Calif., is also of the opinion that early feeding is not based on any sound nutritional or medical grounds.

Dr. Henry L. Barnett, Professor, Albert Einstein Medical School, Yeshiva University, New York, raises the question of overtaxing the excretory capacity of the kidney as a result of early solid feeding. Projecting the same view, Dr. Lee Forest Hill, Chief of Pediatrics, Blank Memorial Hospital, Des Moines, Iowa, states that recent studies have shown that the feeding of concentrated formulas imposes an excessive load of substances for urinary excretion which may result in undesirable effects. He warns that when infants are given concentrated feedings "increased demands for water, such as excessive sweating, vomiting, diarrhea, or inability of the kidney to concentrate if uncompensated, can readily exhaust the water reserves and lead to dehydration and illness."

Dr. Benjamin M. Kagan, Director of Pediatric Research, Michael Reese Hospital, Chicago, Ill., finds the problem of renal complications resulting from early solid feeding particularly significant in the premature infant. He believes that early intake of foods high in protein or ash content places an unnecessary burden on the immature kidney function. He adds "the too early addition of added carbohydrate (cereal) may cut down on the volume of milk taken, with its essential contribution of calcium. On the other hand," he contends, "there is no evidence that supple-

mental food, other than vitamins, is needed before three months of age."

Dr. Harry H. Gordon, Chief Pediatrician, Sinai Hospital, Baltimore, Md., voices strong opposition to adding solids under the age of three or four months except in the case of infants who vomit easily, and expresses concern about the psychological after-effects of such practice. He puts it this way, "I believe that some permissive physicians prescribing for compulsive mothers, or compulsive physicians prescribing for permissive mothers, end up with over-stuffed obese babies during the first six months of life." And a pattern of obesity during infancy, he adds, may contribute to the development of obesity throughout childhood and perhaps a later neurosis.

For his part, however, Dr. Stewart H. Clifford, Chief of Premature Infant Service, Children's Medical Center, Boston, Mass., did not question the desirability of early introduction of solid foods. He says that theoretically, a solid diet gives the infant a wider choice of protein and minerals than a milk diet. Practically, he feels, the infants thrive and develop more solid tissues and are less likely to be anemic than when put on a plain milk diet. And he states that he knows of but few reports regarding ill effects resulting from early solid feeding.

And finally, Dr. Milton J. E. Senn, Professor, Yale University Medical School, in deplored the current trend of solid feeding states "the psychology behind streamlined infant feeding is not only unphysiologic, but since it seems to be part of the general cultural trend to speed up everything, it may be evidence of a pathologic trend in our society." In the long run, he says, this makes for a series of psychological mishaps with the consequence that there is need for an ever increasing number of child psychiatrists to "mop up" the psychopathological effects precipitated in part by parent pressure and abetted by the pediatrician unable or unwilling to resist such pressure.

The forum on early solid feeding to infants is one of a series to be placed on surveys conducted by the *Quarterly Review of Pediatrics* on various aspects of child care.

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Reporting on 15 cases of chronic urinary tract infections in which Furadantin® (Eaton brand of nitrofurantoin) was used, Dr. Seymour W. Rubin, Dr. Maxwell Ibsen and Dr. Albert E. Goldstein state in the Bulletin of the Dade County Medical Association (24:29 (April) 1954) that there were "very satisfactory clinical results in 10 and one was somewhat better clinically." The cases were limited to chronic infections where repeated trials of many varieties of chemicals and antibiotics had been made.

The organisms against which Furadantin was found most effective were *Proteus morganii*, *Coli-aerogenes*, and *paracolon*. The authors observe that "Furadantin exhibits antibacterial effects against some strains of *Proteus*, a very significant fact because heretofore very few drugs were effectual against *Proteus*."

Furadantin diagnostic tablets were used to determine sensitivity of the organism to Furadantin. The investigators state that the tablets are "a very useful adjunct along with the urine culture."

FURADANTIN

S. G. E. Stevens, chief chemist for Menley & James, Ltd., Eaton Laboratories' licensee in England, recently visited Eaton Laboratories at Norwich, N. Y. Mr. Stevens is mainly interested in the two nitrofurans, Furadantin®, used in human medicine for refractory urinary tract infections, and Furoxone®, a component of medicated feed mixes for poultry. Both drugs will soon be marketed in England.

ROBALATE

Dr. Leonidas H. Berry, professor of gastroenterology and gastroscopy at the Cook County Graduate School of Medicine, Chicago, Ill., is studying the effect of dihydroxy aluminum aminoacetate (Robalate 'Robins') on ulcer patients, with emphasis on gastroscopic observations. In announcing the grant, Dr. W. R. Bond, director of clinical research, the A. H. Robins Co., Inc., Richmond, Va., said Dr. Berry would conduct the study at Cook County and Provident Hospitals over the coming year.

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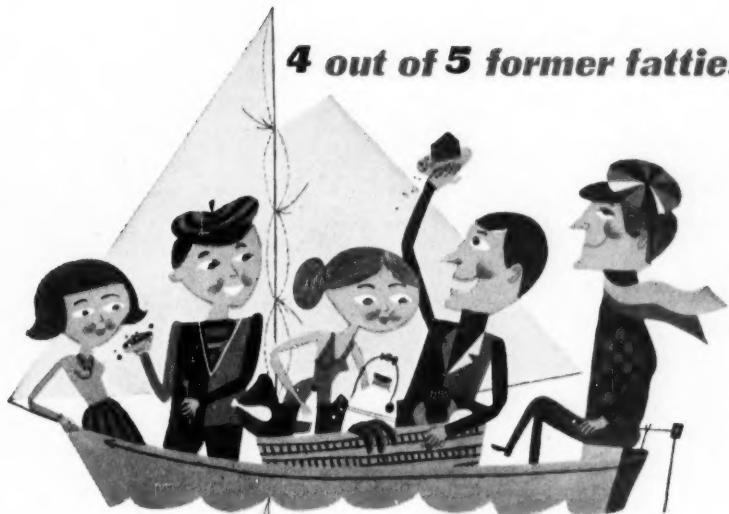
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Reference: 1. Hollander, F.: Arch. Int. Med. 93:107 (Jan.) 1954
2. Deutsch, E.: Scientific Exhibit, Gastroscopy,
Interim Session A.M.A., St. Louis, December, 1953



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*Aaron, H.:
Weight Control,
Consumer Reports
17:100 (Feb.) 1962.



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Abnormal Motility as the Cause of Ulcer Pain

Until recently the general opinion was held that ulcer pain was primarily caused by the presence of hydrochloric acid on the surface of the ulcer.

Present investigations^{1,2} on the relationship of acidity and muscular activity to ulcer pain have led to the following concept of its etiologic factor:

"... abnormal motility² is the fundamental mechanism through which ulcer pain is produced. For the production and perception of ulcer pain there must be, one, a stimulus, HCl or others less well understood; two, an intact motor nerve supply to the stomach and duodenum; three, altered gastro-duodenal motility; and four, an intact sensory pathway to the cerebral cortex."

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1. Schwartz, I. R.; Lehman, E.; Ostrove, R., and Seibel, J. M.: A Clinical Evaluation of a New Anticholinergic Drug, Pro-Banthine, to be published.

2. Ruffin, J. M.; Baylin, G. J.; Legerton, C. W., Jr., and Texter, E. C., Jr.: Mechanism of Pain in Peptic Ulcer, *Gastroenterology* 23:252 (Feb.) 1953.